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New Haven College Catalog

Day Division

1969-1970

INC. 1920

New Haven College, 300 Orange Avenue, West Haven, Conn. 06516

Day Credit Division

Calendar

SUMMER SESSION 1969

		1969
Registration period	Tuesday-Wednesday	June 3-4
Tuition due on or before	Wednesday	June 4
Classes begin	Monday	June 16
Holiday	Friday	July 4
First term final examinations	Monday	July 21
Second term classes begin	Wednesday	July 23
Second term final examinations	Wednesday	August 27

FALL SEMESTER 1969

*Registration and Tuition due—all students	Friday	August 22
College Residence Charges due	Friday	August 22
Labor Day (holiday)	Monday	September 1
Orientation, first-year students	Monday-Wednesday	September 8-10
Classes begin	Thursday	September 11
Thanksgiving (holiday)	Thursday-Friday	November 27-28
Christmas vacation	Saturday-Sunday	December 20 January 4
		1970
Classes resume	Monday	January 5
Last day of classes	Friday	January 9
Final examinations	Saturday-Monday	January 10-19
Recess	Tuesday-Tuesday	January 20-27

SPRING SEMESTER 1970

*Registration and Tuition due—all students	Friday	January 9
College Residence Charges due	Friday	January 9
Orientation, new students	Monday-Tuesday	January 26-27
Classes begin	Wednesday	January 28
Spring vacation	Saturday-Sunday	March 21-29
Classes resume	Monday	March 30
Last day of classes	Tuesday	May 19
Final examinations	Wednesday-Thursday	May 20-28
Commencement	Sunday	June 14

SUMMER SESSION 1970

Registration period	Tuesday-Wednesday	June 2-3
Tuition due on or before	Wednesday	June 3
Classes begin	Monday	June 15
Holiday	Friday	July 3
First term final examinations	Monday	July 20
Second term classes begin	Wednesday	July 22
Second term final examinations	Wednesday	August 26

* Students admitted after August 22nd (first Sem.) or January 9th (second Sem.) must register and pay tuition within ten days of admission, and in no case later than the opening day of classes.

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The College reserves the right to change any provision or requirement designated herein, and to effect the withdrawal of any student whose conduct at any time is not satisfactory to the College.

History

New Haven College is a private, coeducational, independent, urban college founded by the Y.M.C.A. of New Haven in 1920 as a branch of Northeastern University. The College has held for its primary function service to the individual student as well as to business, industry, and institutions of the New Haven area. It has a strong sense of responsibility to the community.

By act of the Connecticut General Assembly, the College was incorporated in 1926 and was authorized to grant the Associate in Science degree. At the same time, an agreement was negotiated with Yale University for the use of classrooms and laboratories for the operation of an evening division. During the years which followed, the College, in cooperation with local business and industry, developed and conducted a systematic educational program.

From 1941 to 1945, the College administered the official Yale University Engineering, Science, Management, War Training Program for New Haven County. Accreditation of its Associate in Science degree programs in 1948 by the New England Association of Colleges and Secondary Schools marked another significant step forward.

The next decade saw the inauguration of the Reading Center, the Division of Special Studies and the School of Executive Development, now the Management Center. During this period also two daytime programs for recent high school graduates were begun. These were in Industrial Administration and Engineering.

Since 1958 New Haven College has been authorized by the Connecticut General Assembly to offer courses of study leading to the Bachelor of Science degree to both day and evening students. The acquisition of the present campus in 1960 provided an opportunity for the College to expand its offerings for full-time students and to develop further its other credit and non-credit curricula. In March, 1962, the College acquired an additional 28 acres of undeveloped land three blocks north of the present campus, which is the site of new athletic facilities, including playing fields and a physical education building which will be finished by 1970.

In December, 1966, the College received accreditation of its Bachelor degree programs by the New England Association of Colleges and Secondary Schools. The attainment of full accreditation, a major step forward, has further helped the College to pursue its principal objectives: to provide leaders and professional personnel within the framework of our democracy, to produce well-educated citizens with an understanding of important cultural and scientific progress, and to encourage students to reach the maximum of their potential.

Divisions of the College

New Haven College has three administrative divisions: the Day Credit Division, the Division of Continuing Education, and the Management Center. Included in the Division of Continuing Education are the Evening Credit Program, the Extension Credit Programs, the Summer School, the Division of Special Studies, and the Reading Center. All divisions of the College are co-educational.

Credit Programs

Day The degree-granting Day Division offers curricula which lead to the four-year Bachelor degree and the two-year Associate degree.

Students pursuing a course of studies leading to a Bachelor of Science degree in Business Administration may elect a major in Accounting, Economics, General Management, Operations Management (including Computer Concentration), Marketing, or Public and Social Administration. Law Enforcement, with majors in Administration or Science, is an option under Public and Social Administration.

Students pursuing a course of studies leading to a Bachelor of Science degree in Engineering may elect a major in Electrical Engineering, Industrial Engineering, or Mechanical Engineering.

Students pursuing a course of studies leading to a Bachelor of Arts degree may elect a major in Chemistry, Economics, English, History, Mathematics, or Physics. By taking a modified program in either Chemistry or Physics the student may receive a Bachelor of Science degree. A student may also elect to pursue an interdisciplinary course of study leading to a Bachelor of Arts degree in American Studies.

An Associate in Science degree may be obtained in Business Administration, Engineering, Law Enforcement, or Arts and Sciences.

Students pursuing a course of studies leading to an Associate in Science degree in Arts and Sciences may elect a major in General Studies, Biology, Commercial and Advertising Art, or Journalism.

Evening The degree-granting Evening Division offers curricula which lead to a Bachelor of Science, a Bachelor of Arts, or an Associate in Science degree.

A Bachelor of Science degree is offered in the following areas: Business Administration with majors in Accounting, Economics, General Management, Operations Management (including Computer Concentration), Marketing, Public and Social Administration; Electrical Engineering; Industrial Engineering; and Mechanical Engineering. Law Enforcement, with majors in Administration or Science, is an option under Public and Social Administration.

A Bachelor of Arts degree may be obtained in the following majors: Chemistry, Economics, English, and History.

An Associate in Science degree is offered in the following areas: General Studies; General Management; Engineering with a major in General, Electrical, Industrial, Mechanical, or Metallurgical Engineering; and Law Enforcement.

For further information regarding the Evening Division, see the *Evening Division Bulletin* which may be obtained at the College or write to the Director of Continuing Education.

The Division of Special Studies

This Division offers a series of professional certificate courses in engineering, business, and general areas. They are usually designed to provide supplemental knowledge and skills needed in specialized jobs in business and industry, and do not carry academic credit. Further information may be obtained by requesting separate schedules and course folders from the Director of the Division of Special Studies.

The Management Center

The purpose of the Management Center is to provide educational opportunities for those managers and administrators in industry, business and service organizations whose needs are not met in more conventional undergraduate or graduate programs. The overall objective of the Center is to offer programs to help managers of maturity and experience meet the broader and more complex requirements of positions of greater responsibility in their organizations.

Broadly speaking, the programs of the Center are designed to meet the needs of two different levels of management, 1) that of staff and line executives at upper levels, and 2) middle management administrators. At the upper executive level the programs consist of seminars and workshops of varying lengths as needed. At the middle management level the standard format is a part-time on-campus program. Also planned are in-plant programs in which the curriculum will be specifically designed to meet individual company or industry needs. In addition there are special programs available on an ad hoc basis, either on or off campus, as required.

The Reading Center

The New Haven College Reading Center offers a varied program of reading techniques and study skills to fit the specific needs of adults and high school or college students. In-plant management training programs can be arranged. Additional information may be obtained from the Director of the Reading Center.

Accreditations and Memberships

New Haven College is a coeducational, non-sectarian, independent institution of higher learning chartered by the Legislature of the State of Connecticut and accredited by the Connecticut State Department of Education as a junior and senior College. The College holds membership in the New England Association of Colleges and Secondary Schools and the Connecticut Conference of Independent Colleges, and is also a member of New England and national educational and professional organizations.

The New England Association of Colleges and Secondary Schools accredits schools and colleges in the six New England States. Membership in one of the six regional accrediting associations in the United States indicates that the school or college has been carefully evaluated and found to meet standards agreed upon by qualified educators. Colleges support the efforts of public school and community officials to have their secondary schools meet the standards of membership.

Admission

Since each program of the College has its own admission requirements, these requirements are defined in detail in subsequent pages of this catalog.

In general, graduates of accredited secondary schools are eligible for admission. However, in special cases persons who have not completed their high school education may be admitted to the various divisions of New Haven College by meeting certain specified conditions.

In the case of adults, the College is interested in evidence of maturity and motivation as well as in formal education as prerequisites for admission.

With the exception of "auditors," students wishing to take any course, whether or not they seek a degree, must satisfy the admission requirements.

New Haven College welcomes the applications of students from all geographic areas, from public or private schools, and from all races, economic levels and religions.

Advanced Placement

The College recognizes the program of Advanced Placement available to talented high school students, operated by the College Entrance Examination Board. Students satisfactorily completing Advanced Placement courses in high school and the final examination prepared by the Educational Testing Service may be given appropriate college credit if their courses are similar to those offered at New Haven College.

Advanced Placement courses are graded from 1 to 5. Credit is allowed where the grade earned is 3, 4, or 5. Credit may be given for a grade of 2, if a careful review of the test by this College determines acceptability. No credit will be allowed for a grade of 1. Students desiring to submit Advanced Placement courses for college credit should have all results of these courses and tests sent in connection with their application to the Admissions Office.

Pre-Professional Programs

In addition to the traditional professions such as law, medicine, public service and the ministry, more and more vocations require that students continue their training after earning the bachelor degree. Students who wish to begin training for a profession at the graduate level should write to the university they expect to attend and ask for a statement of the entrance requirements. Prescribed programs in the major areas will be modified to meet requirements for entrance into professional programs or to meet the special needs of individual students. Such programs must be approved in writing by the Director of Student Services.

Admission of Students Transferring from Other Colleges

Requirements Transfer students who present evidence of completion of at least thirty semester hours of study at an accredited college with a grade of "C" or better may be admitted on the basis of an official transcript and will not be required to take the Scholastic Aptitude Examination.

For the purpose of determining placement, the following examinations are required as indicated below:

The Mechanics of English Examination and the Reading Comprehension Examination are required unless the transcript shows the completion of at least three semester hours of college English with a grade of "C" or better.

The Mathematics Examination is required, unless waived by the Mathematics Department, for those students whose programs require mathematics.

Placement in courses as a result of the above examinations will be on the same basis as for applicants from secondary schools.

Transfer students who do not have the required thirty semester hours of work as noted above, or who have been dismissed for academic deficiency, are required to take the Scholastic Aptitude Examination in addition to the other placement examinations which are applicable, as described above. Students who have been dismissed for academic deficiency will be considered only after the lapse of one semester.

Transfer students who are not certain of the quality of their previous work are advised to take all entrance examinations lest their transcripts be delayed or be of an unacceptable quality.

Advanced Standing Transfer credit from other colleges will be officially granted upon the successful completion of 12 semester hours at New Haven College.

Transfer students who wish to fulfill the requirements for any degree (Associate or Bachelor) at New Haven College must complete the last thirty semester hours of the program at this College. Also, for Associate degrees twelve semester hours must be in the field of specialization, and for Bachelor degrees eighteen semester hours must be in the field of specialization.

Crediting Examinations

Students who have gained, through independent study or experience, knowledge of the content of courses offered by the College for undergraduate credit may, with the approval of the chairman of the department by which the course is offered and the dean of the school in which he is enrolled, receive credit for such courses by special examination.

No student may take crediting examinations during the first or last semesters in which he is enrolled. To graduate, he must earn at least 30 semester hours through regular course work.

Admission Procedure

1. Write or telephone the College for information and, if you desire, arrange for an interview. Telephone (Area Code 203) 934-6321.
2. Secure an application form from the Admissions Office of the College or from your high school guidance counselor.
3. Submit the completed application form with a $10 application fee. This fee is not refundable.
4. Request your school to submit a transcript of your secondary school record.
5. Take the Mathematics placement test.
6. Submit College Board test scores (S. A. T.), or American College Testing Program test scores (A. C. T.).
7. When notified that the conditions for admission have been met, mail a tuition deposit of thirty-five dollars ($35.00) to be credited on the first-term bill. This deposit is a reservation for a place in the class and cannot be refunded.

Registration

Degree and Non-Degree Students There are two parts to registration: the completion of the registration forms and the payment of tuition. Both should be completed before the closing date of registration as stated in the calendar. There is a penalty fee for delaying either of these two processes beyond the closing date of registration.

Registration is possible during office hours on the registration dates stated in the calendar.

Registering for new students must be in person at the College office. Currently enrolled evening students may pre-register by mail. Forms are mailed to the student prior to the announced registration dates. For currently enrolled day students, registration dates and procedures will be posted in advance.

A separate registration is required for each of the semesters and for the summer session.

Changes of Registration and Schedules

Students are urged to plan their programs carefully before completing the registration forms in order to avoid the need for requesting changes. Once the registration is completed, the student is charged the Change of Registration Fee for each change he makes. The fee is payable when the student completes the form requesting the change.

Student Personnel Services

Recognizing the importance of non-academic activities to the development of the student, the College offers a well-rounded program of services and activities designed to make assistance available when needed and to provide outlets for maturing student interests.

Counseling and Guidance The Counseling and Guidance program at New Haven College is under the direction of the Coordinator of Counseling with several professional consultants on his staff. Students need only to schedule an appointment in order to gain help and information. By inquiring at the Counseling Office, a student will be referred to the person most qualified to discuss his problem.

Guidance and Counseling services are available in such areas as personal, marital and domestic problems, vocational information, graduate schools, professional referrals and religious affairs.

In addition to the Guidance and Counseling Coordinator, members of the faculty and staff reserve many hours for academic counseling.

Placement Service Requests are often received from students and employers for job placement services. Although the College does not conceive its function to be that of a public employment service, it is interested in and prepared to render placement service within the limitations of its purpose and resources. It acts as a medium of exchange of information between students and former students who desire placement, and employers seeking personnel. It is particularly interested in helping students to find positions which require college study or which lead to positions that require such education, and in assisting students to find employment related to their programs of study.

A student or former student of the College who desires placement should call at the office for a placement application form and at that time will receive specific information as to whom he is to contact in regard to his placement problem.

A company wishing to use the placement facilities of the College should list the job and the desired qualifications in the form of a letter. A member of the College staff will then contact the company to discuss procedure and possibilities of filling the position.

Testing Counselors, upon request, will report and interpret to students the results of their entrance tests.

The Directors of Admission and of Guidance, as professional vocational counselors, are prepared to undertake vocational testing and counseling with students requesting this service.

Student Housing The College provides assistance to those students seeking housing for the school year. Students not living with their parents are required to live in College approved housing. Rooms in private residences and apartments convenient to the College may be obtained through the Housing Office. Also, a new residence for male students is available on a first-come basis.

The College provides a Cafeteria facility for all students living away from home.

For information on Residence charges—Cafeteria and Dormitory—please refer to Tuition, Fees, and Expenses, page 21.

Financial Aid

Well over one-third of the students at the College receive financial assistance annually, in the form of scholarships, grants, loans, bursary work, and the College Work-Study program. Applications by returning students should be made no later than May 1 for the following year, and by new students at the time of acceptance.

Financial aid is not usually available for the Summer Term. Students needing assistance will ordinarily seek employment during the summer to help defray their expenses for the following year.

Academic Scholarships A number of scholarships are awarded each year on the basis of academic achievement, financial need, evidence of self-help, and overall contribution to the College. To be eligible, a student must have a cumulative Quality Point Ratio of 3.0 or better and evidence of financial need.

Donor Scholarships Many scholarship awards are available each year through the generosity of business firms, organizations, and friends of the College. The Alumni Association makes scholarship grants to qualified undergraduates.

Amity Charitable Trust Fund

An annual award is made from the income of this fund to worthy students, based on ability, promise, and financial need without regard to sex, race, country of national origin, or religion. Preference is given to students whose homes are in the Greater New Haven area.

Asarco-Enthone Scholarship

This is an award of $1,000 annually to a student in the field of Chemistry. The recipient must be a male citizen of the United States or Canada in good health. Selection is based on activities as well as scholarship.

The Connecticut Safety Society

Three Everett W. Martin Scholarships are made available annually to qualified students in the Evening Division for the Industrial Safety and Hygiene course.

Industrial Management Club of New Haven

Scholarships are available for students attending New Haven College. These are administered by the Educational Committee of the Industrial Management Club under the policies established by the Club.

H. B. Ives Company Scholarship Foundation

An annual award of $500 is made to a male undergraduate seeking a degree in engineering, business administration, or management. The recipient must be a resident of New Haven County.

The Martin Luther King, Jr., Memorial Scholarship Fund

Annual awards are available to students entering New Haven College who exemplify the ideals of the late Dr. Martin Luther King, Jr.

The New Haven Chapter of the American Society of Tool Engineers

Annual scholarships to students in mechanical engineering are provided.

THE OLIN EMPLOYEES FUND
Full tuition scholarships are offered to sons and daughters of Olin employees meeting the standards of selection.

VIRGINIA M. PARKER SCHOLARSHIP
This was established by Chi Kappa Rho sorority as an annual award to a freshman woman selected on a basis of scholarship, potential, and financial need.

SALES AND MARKETING EXECUTIVES CLUB OF NEW HAVEN
An annual award is open to a superior student in the field of sales and marketing.

WOMAN'S SEAMEN'S FRIEND SOCIETY OF CONNECTICUT
Assistance is offered to sons and daughters of merchant seamen of Connecticut and to students preparing for careers in the maritime industry.

YALE UNIVERSITY
The scholarship plan for sons and daughters of faculty and staff members of Yale University provides scholarship grants to qualified students.

Grants The College awards a limited number of grants to students who have demonstrated academic promise and financial need, while at the same time contributing substantially to some area of College activity.

Students with extreme needs may qualify for grants of from $200 to $1,000 annually under the Educational Opportunity Grants Program of the Federal government. These grants, matched by College assistance, are designed to make possible higher education for capable applicants who would otherwise be unable to attend.

Loan Funds

National Defense Student Loans The purpose of this program, established under the National Defense Education Act of 1958, is to make funds available for loans of up to $1,000 annually to needy students, with preference to those with superior academic backgrounds. These loans are repayable starting nine months after graduation at three per cent simple interest. Special forgiving features make this source advantageous to those going into full time teaching.

United Student Aid Fund This private, non-profit service corporation provides long term, low interest loans to upperclassmen in good standing. Guaranty funds were provided by a donation of the Day Student Council in order for the College to participate.

Guaranteed Loan Programs The State of Connecticut and many other neighboring states have established Higher Education Loan Programs offering long term loans at low interest rates. In Connecticut, a student may borrow up to a maximum of $1,500 each school year, repayable starting one year after graduation. If the family's adjusted income is under $15,000 annually, Federal interest benefits cover the full interest while in attendance.

Institute of Electrical and Electronic Engineers

The Connecticut Section of the Institute of Electrical and Electronic Engineers Student Loan Fund offers non-interest bearing loans to senior students in Electrical Engineering.

Law Enforcement Assistance Programs

Loans The Omnibus Crime Control and Safe Streets Act of 1968 established the Law Enforcement Student Loan Program which makes available ten year, low interest bearing (3%) notes of up to $1,800 per academic year to full-time students enrolled in undergraduate and graduate programs leading to degrees in areas directly related to law enforcement. These loans can be cancelled at the rate of 25% for each year of employment in a public State, Local or Federal law enforcement agency.

Grants Grants are available to full-time employees of a publicly funded law enforcement agency under the Law Enforcement Student Grant Program. Payments up to $300 per semester are provided to full-time or part-time students working toward a degree in this field. Recipients must agree to remain with a law enforcement agency for two years after completion of studies funded by this grant.

Financial need and academic qualifications will be considered in selection of candidates.

Student Employment

College Work-Study Program This federal assistance program is designed to enable students having financial need to work both during the summer and through the school year, thus earning a substantial portion of their college expenses. Work assignments are made on-campus and also with non-profit community organizations such as Community Progress, Inc., the YMCA, the West Haven Board of Education and others.

Bursary Work The College provides many jobs on campus for deserving students who may benefit from this type of employment. Awards are made each semester ranging from $200 to $250 for working an average of ten hours a week. The award is normally applied as a credit against tuition.

Full information and applications for financial aid may be obtained from the Director of Financial Aid.

Foreign Students

The College is fortunate in having a number of other countries represented on the campus. The Foreign Student Advisor provides special guidance when needed, an International Students Club at the College sponsors activities and trips, and the International Students Center of New Haven welcomes all our foreign students to use their facilities and program throughout the year.

Student Activities

Student Councils Separate Day and Evening Student Councils are elected annually by the respective student bodies. The councils have the responsibility for initiating, organizing, and carrying through extra-curricular activities and for performing liaison functions between students and the College staff.

Clubs and Organizations There are more than twenty student clubs and societies open to interested students. Included are student chapters of professional societies, religious organizations, social groups, and special interest clubs.

Athletic Activities Intramural competition is organized and sponsored by the College in basketball, softball, touch football, bowling, golf, and tennis.

A full schedule of intercollegiate athletics is carried out in baseball, basketball, golf, hockey, cross country, track, soccer, and tennis. New Haven College is a member of The National Association of Intercollegiate Athletics, National Collegiate Athletic Association, Eastern Collegiate Athletic Conference, and New England College Athletic Conference.

Fraternities and Sororities Many national and local service, social, and honorary fraternities and sororities are active on campus. They sponsor events such as the Blood Program, T.B. X-rays and other services, as well as social functions.

Publications Student Publications include *The News,* the all-college newspaper edited and published by the student group; *The Chariot,* the annual yearbook; and the *Student Handbook.* Any student may volunteer his services on any of the student publications.

Social Activities Starting with the Freshman Picnic and Freshman Week and reaching a climax with the Senior Banquet and Prom in June, the social calendar is filled with informal and formal dances, the Winter Weekend, a variety show, and several major drama productions. The Evening Division has many social activities of its own, including an annual Christmas party for children, evening receptions, and dances.

The Student Center The Student Center provides a focal point for all student activities. Offering lounges, student offices, game rooms, a large cafeteria, a snack bar, a bookstore, and a music room, the facility has been designed to serve as a center for the student's non-academic college interests.

Special art showings and concerts are presented throughout the year. Seminars planned by students and faculty together are held at frequent intervals. Once a month, the President of the College meets informally with students for a "Fireside Chat" in the Student Center Lounge to discuss all phases of life at the College.

Assemblies Assemblies and lectures are held throughout the academic year. Notable speakers on worthwhile subjects are presented at frequent intervals. Attendance regulations are outlined in the *Student Handbook.*

Student Health Service

Physical Examination Students are required to provide a report of a recent physical examination to the Health Service, upon acceptance. Appropriate forms for this purpose are provided.

Infirmary The Infirmary, located in the Residence Hall, is available for emergency first aid treatment and examination for all students, without charge. Beds are provided for rest and care for mild sickness problems for students living in College approved housing. The College Health Staff includes the College Psychiatrist, Psychologist, Internist and Head Nurse. Infirmary nurses are available on a 24 hour basis.

Accident and Health Insurance The New Haven College Student Insurance Plan is another important service to full-time students and their families. It was conceived and planned by the Student Council and is designed to help all full-time students of the College meet unexpected and, very often, costly medical bills arising from an accident or when hospital and medical services are required due to sickness.

The Plan provides protection while the student is at home, at school, or on vacation, 24 hours a day for a full twelve months. Benefits are payable in addition to those the student may receive from any other policy. Details of the Plan are available in a folder sent to all full-time students or from the school nurse or the Dean of Students.

The fee of $35 is payable with tuition by all full-time students. This fee includes a small charge to help offset costs for the Infirmary which is available to all students for emergency treatment.

Library

The Library contains more than 50,000 catalogued volumes in an open-shelf arrangement, with facilities for study and browsing. Subscriptions to approximately 650 periodicals and extensive back-issue files are maintained. There are also a pamphlet file and rapidly growing microfilm collection. While strongest in the specific areas of study in the college curriculum, the Library's resource materials cover all fields.

The resources of the Free Public Library of New Haven (380,000 volumes) and of the West Haven Public Library (79,000 volumes) are available to all students of the College. For those who are not residents of the respective communities, there is a nominal borrower's charge, although anyone may use without charge materials within the building of these libraries.

Alumni Association

Membership in the Alumni Association is acquired immediately upon graduation from either the associate or the bachelor program. A member of the administrative staff of the College serves as Director of Alumni Relations. An Executive Committee conducts the affairs of the Association during the periods between annual meetings and also serves as a planning group. There is a standing committee on annual giving.

In addition to the annual meeting, other meetings of social and educational interest occur during the year, and a quarterly publication, the *Alumni News*, is mailed without charge to each alumnus.

The Alumni Association is represented on The Board of Governors by the election of a member to the Board for a term of two years. The president of the Association serves on The Board of Governors as an ex-officio member.

Alumni Advisory Council

Membership on the Alumni Advisory Council is by invitation. Sixteen distinguished graduates of the College presently constitute the group. The Council is an advisory board to the College in the conduct of alumni affairs. Its primary objectives are to strengthen alumni relations, advise on matters of top-level policy involving the alumni, improve communications with them, and assist in planning and conducting alumni events. The Council meets quarterly at the College with the President of the College and the Director of Alumni Relations.

Scholastic Regulations

Grading System The following grading system is in use, and except where otherwise specified, applies both to examinations and to term work. The weight of a final examination grade is a matter individually determined by each instructor.

A	Superior
B	Good
C	Fair
D	Lowest passing grade
F	Failure
Inc.	Incomplete. Indicates that some work remains to be completed. Such work must be made up within six months to remove the "incomplete." Otherwise, the "Inc." remains on the student's record for one semester, after which the "Inc." is changed to "F" and no credit is given for the course.
WD	Withdrawal. Indicates either (1) withdrawal prior to the midpoint of semester, or (2) withdrawal after the midpoint of semester and work satisfactory at that time.
WF	Indicates withdrawal after midpoint of semester with unsatisfactory work. A "WF" is a failing grade.
S	Satisfactory. Given only in non-credit courses.
U	Unsatisfactory. Given only in non-credit courses.

Grade Reports Reports of the final grade in each subject will be mailed to the student soon after the close of each semester. The same report will be mailed to employers in those instances where the student has given his approval. Reports will be mailed to parents or guardians of all students under 21.

Academic Standards The academic standing of each student will be determined on the basis of his quality point ratio each semester.

In order to determine quality point ratios, each letter grade is assigned a quality point value:

A	4 quality points
B	3 quality points
C	2 quality points
D	1 quality point
F	0 quality points
WF	0 quality points

The quality point ratio for all students is obtained by multiplying the quality point value of each grade by the number of semester hours of the course, then dividing the total quality points by the total semester hours.

Students are required to maintain a quality point ratio in accordance with the following scale:

Quality Point Ratio of 1.50 for 3-30 semester hours attempted
of 1.60 for 31-45 semester hours attempted
of 1.70 for 46-60 semester hours attempted
of 1.80 for 61-75 semester hours attempted
of 1.90 for 76-90 semester hours attempted
of 2.00 for 91 or more semester hours attempted

Failure to earn the required quality point ratio will place a student on academic probation for the following semester of enrollment. A student is automatically dismissed when he receives a third probation, or when his quality point ratio for any one semester is less than 1.00.

Readmission Application for readmission after a student has been dismissed will be considered only after the lapse of a semester and only when the student provides evidence which indicates his probable success if readmitted.

Requests for readmission should be submitted in writing to the Dean of the academic division involved at least three weeks before the opening of the semester and should include evidence supporting the student's belief that he will succeed if readmitted.

Readmission does not automatically follow; each application is decided individually by the Committee on Academic Standing.

Dean's List Full-time students who earn a quality point ratio of 3.20 or better in any one semester will be placed on the Dean's List.

All part-time students who have accumulated a minimum of 14 semester hours at the College will automatically be considered for the Dean's List at the end of each semester. A cumulative quality point ratio of 3.20 or better is required.

Requirements for the Degrees

The Bachelor and Associate degrees will be conferred at Commencement when the student has met all the requirements of his program and

1. has earned a cumulative quality point ratio of at least 2.00;
2. has been recommended by the faculty;
3. has met all financial obligations.

Bachelor Degree with Honors

Honors may be conferred upon candidates for graduation who have completed at least 60 semester hours of work at New Haven College in their junior and senior years. The following standards shall be used:

1. The Bachelor degree *Cum Laude* may be awarded to a student whose cumulative quality point ratio is at least 3.25 at the end of the first semester of his senior year and who continues to attain the same standard for the remainder of the year.

2. The Bachelor degree *Magna Cum Laude* may be awarded to a student whose cumulative quality point ratio is at least 3.50 at the end of the first semester of his senior year, who continues to attain the same standard for the remainder of the year, whose quality point ratio in all courses counting toward his major is at least 3.50, and who has completed all the suggested courses within his curriculum.

3. The Bachelor degree *Summa Cum Laude* may be awarded to a student whose cumulative quality point ratio is at least 3.70 at the end of the first semester of his senior year, who continues to attain the same standard for the remainder of the year, whose quality point ratio in all courses counting toward his major is at least 3.70, and who has completed all the suggested courses within his curriculum.

Advanced Study

Advanced study courses are offered for qualified students in the departments offering the degree of Bachelor of Science or Bachelor of Arts. These courses may include a thesis, tutorial work, or independent study which permits the students to work intensively in areas of special interest.

Associate in Science Degree with Honors

A degree *With Honors* is awarded to students who have a quality point ratio of 3.25 for the semester hours specifically required for the degree program from which they are being graduated, and who have taken all the required work at this College.

Transfer students will be awarded honors on the same basis, with the provision, however, that their total average will be considered only when they have an honor average for studies completed at this College.

A degree *With High Honors* is awarded to students who have a quality point ratio of 3.50 based on the same considerations as noted above.

In determining eligibility for degrees with honors, credits earned by crediting examinations and electives in excess of those required will not be considered.

Transferability of Credit

In accordance with the usual practice among institutions of higher learning, transfer of credit from this College to another institution will be determined by the other institution in terms of the achievement and promise of the individual seeking transfer. The institution to which transfer is being made will also evaluate specific courses in terms of their length and content in relation to its specific requirements. New Haven College is an accredited institution and its credits will be given consideration by the major institutions of the country in terms of the conditions outlined above.

Course Overload Restriction

A student may not register for a course load in excess of 18 semester hours without prior written approval by his departmental chairman. The chairman, at his discretion, may grant overload approval not exceeding one course if the student's Quality Point Ratio is 2.50.

Attendance Regulations

Classes are operated on the policy that it is necessary for all students to attend all class meetings. If a class is missed, the benefits from participation in the class discussion and instruction are completely lost. No student, regardless of ability, can afford that loss.

Evening Credit Programs A student is allowed only two absences per semester for a 3-or-4 semester hour course. If the student is absent more than twice, permission to continue in the course must be obtained from the instructor.

Day Credit Programs Attendance regulations for daytime students are outlined in the *Student Handbook.*

Reserve Officers' Training Corps

Military Science

New Haven College students are eligible to participate in the United States Army and Navy R.O.T.C. "Contract" Programs as administered by the Departments of the Army and Navy R.O.T.C. units at Yale University.

The purpose of these programs is to provide junior officers who have the qualities and attributes essential to their progressive and continuous development in the United States Army or Navy Reserves. This purpose is attained through a four-year course of instruction in military subjects, supplemented by an additional summer training period.

A two-year intensified program has been initiated recently by both services. It provides that sophomores, or upperclassmen with at least two years of undergraduate study remaining, may complete all requirements of the four-year programs. A six weeks' summer camp session, in the case of the Army, or a similar period of academic and physical training on an Eastern university campus in the case of the Navy, is required.

Further information regarding R.O.T.C. programs may be obtained from the office of the Vice President at New Haven College or at the R.O.T.C. offices at Yale University.

Coordinated Course Offerings

New Haven College Quinnipiac College

In order to broaden the educational opportunities available to their students, New Haven College and Quinnipiac College have entered into a reciprocal agreement through which students formally enrolled in either institution may elect certain courses offered by the other college, subject to the approval of the respective Deans.

Credit, grades, and quality points earned in courses covered by this agreement will be officially recorded at New Haven College.

The Director of Student Services of New Haven College should be consulted for additional information concerning these coordinated course offerings.

Summer Sessions of the Day and Evening Credit Divisions

The College offers summer sessions with these primary functions:

1. To offer opportunity for summer study to those residents of the New Haven area who attend other schools during the regular school year. For financial reasons, most of these students find it desirable to live at home and work during the summer. The summer program of the College is offered in both the Day and Evening Divisions. Reasons for summer study vary, but are generally confined to the following:
   a. To make up deficiencies.
   b. To satisfy prerequisites for courses in the present institution.
   c. To acquire advanced standing in the parent school.

   In general credits earned at New Haven College are acceptable to parent institutions. For assurance of the acceptance of credit by the parent school, written approval of that school is required. The College is a member of the New England Association of Colleges and Secondary Schools.
2. To provide opportunity for summer study to the students of the College. Reasons for summer study for this group of students may be described as follows:
   a. To lighten the study load during the regular school year, but still meet the yearly requirements of the program.
   b. To shorten the normal time required for a degree.
   c. To take preparatory work.
   d. To make up deficiencies caused by failure in certain courses.
   e. To take additional work beyond the degree and yet complete a program within the normal time.

The accomplishment of any one of the five objectives listed above will depend on the specific subjects offered during any summer session.

Registration For all new students a personal interview with a staff member of the College is necessary. Registration procedures will be explained at this time. For those new students who desire work for credit in other institutions, prior approval must be obtained from those institutions (see 1. above). This procedure should be followed each semester regardless of previous attendance.

Transferring of Credits Credits may be transferred from New Haven College, a fully accredited college, to any other college or university, merely by obtaining a letter of authorization from the school regularly attended.

Tuition, Fees and Expenses

Day Division Regular Academic Year

Application fee	$ 10.00
Payable only once at the initial time of application. Not refundable.	
Deposits	
1. Acceptance deposit	35.00
Payable by all *incoming freshmen* and *transfer* students upon notification of acceptance and credited to next semester's tuition. Not refundable.	
2. Reservation registration deposit	35.00
Payable by all full-time undergraduate students at time of registration for the next semester to reserve a place on the rolls of the College for that semester. Credited toward tuition. Not refundable.	
Tuition	
1. Full-time student (12-18 credit hours or equivalent) each semester, per semester	625.00
2. Less than 12 credit hours or equivalent, per credit hour	50.00
3. More than 18 credit hours or equivalent, per credit hour	50.00
Student activity fee, per semester	30.00
Covers subscription to College newspaper, admission to home athletic events, use of Student Center, and helps defray cost of student activities and facilities.	
Student accident and health insurance, per year	35.00
Due and payable with tuition by all full-time students. See page 15 for details.	

Evening Division Regular Academic Year

Application fee	10.00
Payable only once at the initial time of application. Not refundable.	
Tuition—per credit hour or equivalent	33.00
Student activity fee—included in tuition charge.	
Covers subscription to College newspaper, use of Student Center and helps defray cost of student activities and facilties.	

Summer Terms

For information regarding both Day and Evening summer sessions, request the Summer School Bulletin.

Other Charges

Change of registration	5.00
Assessed for changing courses or sections after the completion of registration.	

Late fee Assessed for failure to complete registration and/or payments before due date. All students who have not completed tuition payment by the start of the semester will be assessed an additional late fee of $5.00 plus $1.00 for each additional day thereafter.	5.00
Laboratory and Breakage fees—payable each semester by students registering for courses requiring the laboratory fee. See Course Description for specific amounts. Not refundable.	
Make-up examination Assessed when a student is permitted to take an end-of-semester examination at a time other than the scheduled time, except for conflicts caused by the examination schedule.	5.00
Make-up test Assessed when a student is permitted to make up an announced test during the semester.	3.00
Auditors—The fee for a student auditor in any course or courses is the same as if the courses were taken for credit.	
Graduation fee Assessed regardless of participation in exercises and due before March 1st of year of graduation. The fee is not refundable if the applicant fails to graduate and must be paid each time the student applies.	25.00
Transcript of academic work—no charge for the first one; thereafter, per copy	1.00

Residence Charges

Undergraduate students who do not live at home are required to live in the College Residence or in College approved housing.

Residence room, per semester Rooms are contracted for the entire academic year and the student is responsible for the room rent whether or not he occupies the room. The College assumes no responsibility for the loss or destruction of any clothing or personal belongings of the student. The Residence will be officially closed during Christmas and Spring vacation periods when classes are not in session.	$275.00
Room deposit Payable by all Residence students at the time of application. Credited toward Room Charges.	100.00
Board, per semester	
Seven day, 20 meal plan (6 days, 3 meals, and Sunday, 2 meals)	225.00
Five day, 15 meal plan (5 days, 3 meals)	200.00

N.B. All students living in the College residence are required to subscribe to one of these plans.

Residence breakage deposit	50.00

Payable only once with initial Room Charges and refunded upon graduation or upon official withdrawal from the College. It is liable to deductions for unpaid charges.

Payment of Bills

Tuition, fees, and other College charges are payable in advance. Payment made by check or money order should be made payable to New Haven College.

As a convenience to those who desire to spread their payments out over a period of time, a deferred educational payment plan is available to full-time students and to part-time students carrying six or more credits or the equivalent. Details of this plan are available at the Business Office.

Summer Terms: Because of the short duration of the summer terms, the total amount due for tuition and fees is due and payable at time of registration for each term.

Failure to Pay

The College withholds the giving of grades, the issuance of transcripts, and the granting of honorable dismissal to any student whose account is in arrears.

Withdrawal—Day Division

From College—Students are required to discuss their intentions with the Coordinator of Counseling before withdrawing from the College.

From a Program—Students considering a change in program should first discuss the matter with the Department Chairman of the proposed new program. If it is agreed that the change is advisable, written permission will be granted. Forms for making a change are provided at the Counseling Office.

From a Course—Forms are provided at the Counseling Office.

Refund of Tuition

Registration does not carry with it the right of a refund of tuition in cases of withdrawal. No deduction is made for temporary absence from classes, nor is any refund made if a student is suspended or dismissed.

A. Full-time students—No refunds are granted to any student who voluntarily withdraws from the College. In certain cases of involuntary withdrawal before the end of the fifth week of a semester, some refund up to 50% of tuition only may be made, the exact amount of which is determined by the College. These cases are limited to instances of involuntary withdrawal involving:

(1) the death or protracted serious illness of a student; or
(2) involuntary induction into military service.

All requests in cases of the above must be in writing and must be documented. The date of the request for withdrawal will serve as the basis for computing any refund. There is no refund after the fifth week of a semester.

B. Part-time students—Tuition only is refunded or canceled by one of two methods upon receipt of formal withdrawal request before the end of the fourth week of a semester.

1. Percentage basis for any reason during the first four weeks of a semester:
    - 80% of semester tuition—1st week
    - 60% of semester tuition—2nd week
    - 40% of semester tuition—3rd week
    - 20% of semester tuition—4th week
    - 0% of semester tuition after 4th week
2. Pro-rata basis of tuition before end of fourth week involving:

(a) death or protracted illness of student
(b) involuntary induction into military service
(c) transfer or change in work initiated by employer that precludes meeting class schedules

All requests for refund must be made in writing and include necessary documentation.

The College assumes no responsibility beyond the foregoing for withdrawal occasioned by the pressure of family life or occupation.

C. Summer session students—In cases of withdrawal from a course or courses within the first week of each term, a refund of 50% of tuition only is made. There is no refund of summer tuition after the first week.

The foregoing policy is intended to protect the College, since the College plans its expenses and bases its budget upon full collection of tuition and fees from all registered students, and assumes the obligation of supplying instruction and other services throughout the year.

Changes In Arrangements

Because of the difficulty of determining long-range economic trends, the College reserves the right to make such changes in its tuition, fees, and other costs and in regulations, facilities, and class offerings which, in its judgment, are considered necessary and just, and to apply such changes to students already in attendance as well as to new students. No change in charges, however, is made retroactive.

School of Arts and Sciences

John Collinson, Dean

Offering the Degree Bachelor of Arts with Majors in:

Economics
English
History
Chemistry
Mathematics
Physics

Offering the Degree Associate in Science in Arts and Sciences with Majors in:

General Studies
Commercial and Advertising Art
Journalism
Biology

Arts & Sciences

Bachelor of Arts

The School of Arts and Sciences offers a four-year college curriculum leading to Bachelor of Arts and Bachelor of Science degrees. Core requirements for all Bachelor programs are listed below. The requirement for graduation is 120-126 semester hours.

Because some employers and some graduate schools in scientific and technical fields indicate a preference for the Bachelor of Science degree, this degree is offered in Chemistry. If the student wishes to obtain a Bachelor of Science in this major, he may do so by taking a heavier concentration in the sciences. The details of this program are to be obtained from the department chairmen.

A Bachelor of Arts major in American Studies is offered jointly by the departments of English and History. This program consists of a series of interdepartmental seminars emphasizing various aspects of contemporary American civilization and culture and stresses independent reading and research by the student. For further information contact either the Chairman of the Department of History or the Chairman of the Department of English and Humanities.

Admission Requirements

An applicant for admission to the Arts & Sciences Program must be a graduate of an approved secondary school. While no set program of high school subjects is prescribed, an applicant must meet the standards of the College in respect to the high school average and present 15 acceptable units of satisfactory work, including 9 or more units of college preparatory subjects. Satisfactory scores on College Entrance Examination Board (S.A.T.) or American College Testing Program tests (A.C.T.) are required.

Matriculation for Bachelor Degree Students who have completed at least two semesters or equivalent (30 academic credit hours) with a minimum quality point average of 2.00 may apply for matriculation for the Bachelor Degree.

Admission will be limited to applicants who have given evidence of capacity and motivation adequate for upper division work as determined by the department chairman.

Requirements for the Degree

A cumulative quality point ratio of at least 2.00 is required in a Bachelor of Arts student's major field.

Economics An economics major within the broad program of liberal studies provides a preparation for higher positions in business and industry today. It is also excellent preparation for graduate work in business administration or for graduate study in economics itself.

Economics majors will be required to take, in addition to EC 133-134 (Principles of Economics I and II), a total of 30 semester hours, including EC 336 (Money and Banking), EC 320 (Mathematical Methods in Economics), EC 340 (Intermediate Economic Analysis), EC 445 (National Income Analysis and Business Cycles), EC 450 (Thesis). Beyond these requirements, a flexible program may be devised for each major to fit the student's needs and interests. With the approval of the chairman or some other member of the department, a student may elect suitable courses in other departments to fulfill the semester hour requirement. Where the Liberal Arts core curriculum calls for 12 semester hours of mathematics and/or science, economics majors are urged to take M 115 and M 116.

English The study of English as one of the humanistic disciplines offers a solid foundation for graduate work and a liberal education, developing abilities to think critically and write effectively.

The course requirement for English majors is E 113, 206, 211-212, 213-214, and 21 additional semester hours in course work beyond the sophomore level. While no specific courses are required, students will balance their work between period courses and other offerings of the English department. Their major programs must be approved by an advisor who is a member of the English department.

Prerequisites for courses numbered above 300 should include E 113, E 206 and E 211-212. Students not majoring in English who wish to take courses numbered above 300 should have permission of advisors.

History The study of history provides excellent preparation for those seeking professional careers in public service and general administration. This major also builds a good foundation for graduate study in various areas, such as law and teaching.

History majors, in addition to a full year of Western Civilization and American Civilization and with the approval of the chairman or some other member of the department, must take 24 additional semester hours. A flexible program may be devised for each major to fit his needs and interests. Suitable courses in other departments may be chosen to fulfill the semester hour requirement. Students may wish to elect most of their courses in history within a particular field of concentration, but a minimum of at least three courses must be chosen outside that field, at least one being either HS 317 (Renaissance and Reformation) or HS 321 (History of Ancient Greece and Rome). HS 416 (Thesis) is required of all majors.

Chemistry This major is offered for those students who wish to avail themselves of the many career opportunities in the general field of chemistry and also for those who wish to go on to graduate work with a broad liberal education and a thorough grounding in a scientific discipline.

A major in Chemistry must complete the following courses: twelve semester hours of German or Russian or the equivalent, PH 108, 209, 210; SC 411; CH 105, 106, 211, 301, 302, 341, 401, 431, 432, 451, 452 or an elective. In addition he is required to take Mathematics through M 203. Students whose primary interest is in biochemistry or in pre-medical or pre-dental programs should elect SC 121, 122, 131, 132.

Mathematics Mathematicians have been in increasing demand in recent years. Consequently the person who has developed mathematical skills will find ample opportunity for employment and for graduate work if he wishes to continue his studies.

A major in mathematics must complete the following courses: M 117, 118, 203, 204, 231, 301, 321, 322, 411, 412. In addition he must complete M 121, 122 and a 300 level mathematics course or, in lieu of those courses, 9 semester hours of mathematics electives approved by the Department Chairman, plus 12 semester hours of natural science or engineering under advisement.

Physics There are many career opportunities for those who receive a degree in this important discipline.

A Physics major must complete the following courses: PH 108, 209, 210, 211, 301, 351, 352, 371, 372, 373, 404, and 12 semester hours of Physics electives. In addition he must complete M 117, 118, 203, 204, 231, 301; CH 105, 106; and 12 semester hours, or its equivalent, in German or Russian.

Core Requirements for Bachelor of Arts Program

The following course requirements must be fulfilled by all Bachelor of Arts Degree students.

Bachelor of Arts

18-30 s.h.	ENGLISH AND HUMANITIES
3	English Composition
3	English Composition and Literature
6	Fine Arts
0-12	*Foreign Language
6	Literature
21 s.h.	SOCIAL STUDIES AND PHILOSOPHY
6	Economics
6	Western Civilization I & II
3	Philosophy
6	Psychology
	Sociology
	Political Science
12 s.h.	**SCIENCE AND MATHEMATICS
	Physics
	Chemistry
	Science
	Biology
	Mathematics
n.c.	PHYSICAL EDUCATION—2 sem.

Total 60 s.h.

* Competence in the language equivalent to the second semester of the intermediate level.

** Students are urged to elect a laboratory science. If a student elects the first semester of a double number course in science, he must elect the second semester of that course.

Bachelor of Arts Programs
Freshman Year

Fall		Spring	
E 113 English Composition	3	E 206 English Comp. & Lit.	3
HS 111 Western Civilization I	3	HS 112 Western Civilization II	3
Foreign Language	3	Foreign Language	3
Mathematics or Science	3	Mathematics or Science	3
*Elective	3	*Elective	3
PE 111 Physical Education I	0	PE 112 Physical Education II	0
	15		15

* Choices should be determined by the requirements of the student's major.

Economics and History PS 121, SS 113, P 111

Chemistry M 117, 118, CH 105, 106, German or Russian

Mathematics M 117, 118, 121, 122, German, French, or Russian

Physics CH 105, 106, M 117, 118, PH 108, 209, German or Russian. Omit HS 111, 112 in freshman year.

A student will be assigned an advisor in his major area before pre-registration for the first semester of the sophomore year.

Bachelor of Science Programs in Chemistry and Physics

Details of these programs are to be obtained before registration from the respective department chairmen.

Associate in Science

The Arts & Sciences Program offers a two-year college curriculum leading to an Associate in Science degree upon completion. Although primarily a terminal program, most courses will transfer upon completion, should the student wish to continue for a bachelor degree.

This program offers a choice of majors to give the students a certain amount of concentration in fields in which it is felt there will be employment opportunities throughout the nation for both men and women. The four majors offered are General Studies, Commercial & Advertising Art, Journalism, and Biology.

General Studies This major is offered for those students who wish a college degree of a general nature and for those students who have not yet decided upon a field of specialization but who, in the meantime, want to start college work.

Commercial and Advertising Art This major is offered for both women and men who wish to obtain employment in a vast and challenging field. All graphic media, i.e., newspapers, magazines, brochures, "house organs," indoor and outdoor advertising displays, etc. will be covered. In addition, the courses will help develop the artistic talent of those students who are interested in art training to be used in other professions.

Journalism This major is offered for both women and men who wish to obtain employment in the closely related, and ever expanding, fields of journalism and public relations. Students taking this major will have an opportunity to work on the staff of the College student publications.

Biology Opportunities for a student majoring in biology are found in industrial, academic and governmental organizations, as well as in research and medical institutions and laboratories. Examples of these would be positions as Environmental Health and Sanitation Specialists, Medical Technologists, Medical or Scientific Secretaries or Librarians, Cytologists, Nurses or Nurses' Aides, as well as laboratory technicians and researchers in agricultural, biological, and medical laboratories. The greatest opportunities lie in the combined fields of biology and other disciplines such as chemistry, sociology, physics, psychology, engineering, mathematics and business. The most popular of these is the pre-medical or pre-dental program.

TWO-YEAR ASSOCIATE IN SCIENCE PROGRAM

General Studies Major

FIRST YEAR

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
E 113	English Composition	3	E 206	Eng. Comp. & Lit.	3
P 111	Psychology	3	E 201	World Lit. I	3
PE 111	Physical Education I	0	SS 113	Sociology	3
PS 121	American Government	3		Foreign Language *or* History	3
	Foreign Language *or* History	3	PE 112	Physical Education II	0
	*Electives	3-6		*Electives	3-6
		15-18			15-18

SECOND YEAR

	Foreign Language *or* History	3		Foreign Language *or* History	3
EC 133	Prin. of Economics I	3		Philosophy, Music, Modern Art *or* Hist. of Art	3
E 202	World Lit. II	3	EC 134	Prin. of Economics II	3
E 211 E 213	Survey of Eng. Lit. I *or* Survey of American Lit. I	3	E 212 E 214	Survey of Eng. Lit. II *or* Survey of American Lit. II	3
	Science *or* Math.	3		Science *or* Math.	3
	*Elective	3		*Elective	3
		15-18			15-18

* Students who expect to transfer to a four-year program leading to a Bachelor degree should complete 12 hours of science or mathematics and a foreign language.

The student is expected to carry 15 credit hours per semester. A total of 60 semester hours is required for the degree.

Commercial & Advertising Art Major

FIRST YEAR

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
ART 101	Drawing & Painting	3	ART 102	Drawing & Painting	3
ART 111	Design	3	ART 112	Design	3
E 113	English Composition	3	E 206	Eng. Comp. & Literature	3
PE 111	Physical Education I	0	P 111	Psychology	3
PS 121	American Government	3	PE 112	Physical Education II	0
	Electives	3-6	SS 113	Sociology	3
				Elective	3
		15-18			15-18

SECOND YEAR

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
ART 211	Lettering	3	ART 122	Layout & Print. Tech.	3
BA 107	Advertising & Promotion	3	ART 131	History of Modern Art	3
EC 133	Prin. of Economics I	3	EC 134	Prin. of Economics II	3
E 201	World Lit. I	3	E 202	World Lit. II	3
	Science *or* Math.	3		Science *or* Math.	3
	Elective	3		Elective	3
		15-18			15-18

The student is expected to carry 15 credit hours per semester. A total of 60 semester hours is required for the degree.

Journalism Major

FIRST YEAR

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
E 113	English Composition	3	ART 122	Layout & Print. Tech.	3
J 101	Journalism I	3	E 206	Eng. Comp. & Lit.	3
PE 111	Physical Education I	0	J 102	Journalism II	3
PS 121	American Government	3	P 111	Psychology	3
HS 111	History	3	PE 112	Physical Education II	0
	Electives	3-6	HS 112	History	3
				Elective	3
		15-18			15-18

SECOND YEAR

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
EC 133	Prin. of Economics I	3	EC 134	Prin. of Economics II	3
E 201	World Lit. I	3	E 202	World Lit. II	3
J 201	News Writing & Reporting	3	J 301	Advanced Journalism & Feature Writing	3
SS 113	Sociology	3		Science *or* Math.	3
	Science *or* Math.	3		Electives	6
	Elective	3			
		15-18			15-18

The student is expected to carry 15 credit hours per semester. A total of 60 semester hours is required for the degree. The student majoring in Journalism should be able to type.

Biology Major

FIRST YEAR

	Fall	*Sem. Hrs.*	*Lab. Hrs.*	*Class Hrs.*		*Spring*	*Sem. Hrs.*	*Lab. Hrs.*	*Class Hrs.*
E 113	Eng. Comp.	3	0	3	E 206	Eng. Comp. & Lit.	3	0	3
SC 121	Biology I	3	0	3	SC 122	Biology II	3	0	3
SC 131	Biology Lab. I	1	3	0	SC 132	Biol. Lab. II	1	3	0
CH 105	Gen. Chem. I w/Lab.	4	3	3	CH 106	Gen. Chem. II w/Lab.	4	3	3
M 115	Math. Analysis I *or*				M 116	Math. Analysis II *or*			
M 117	Calculus I	3	0	3	M 118	Calculus II	3	0	3
	Foreign Language	3	0	3		Foreign Language	3	0	3
PE 111	Physical Ed. I	0	0	2	P 112	Physical Ed. II	0	0	2
		17	6	17			17	6	17

SECOND YEAR

SC 251	Zoology w/Lab.	4	3	3	SC 252	Botany w/Lab.	4	3	3
SC 411	Biochemistry I w/Lab.	4	3	3	SC 412	Biochemistry II w/Lab.	4	3	3
E 201	World Lit. I	3	0	3	E 202	World Lit. II	3	0	3
	Genetics	3	0	3	P 111	Psychology *or* *Restricted Elective	3	0	3
	*Restricted Elective	3	0	3		Elective	3	0	3
		17	6	15			17	6	15

School of Business Administration

Hugh N. Emerson, Dean

Offering the Degree Bachelor of Science in Business Administration with Majors in:

- Accounting
- Economics
- General Management
- Operations Management
  - Including Computer Concentration
- Marketing
- Public and Social Administration
- Law Enforcement, with options in
  - Administration
  - Science

Offering the Degree Associate in Science in:

- Business Administration
- Law Enforcement

Business Administration

Bachelor of Science

The School of Business Administration offers preparation for managerial and administrative responsibilities through a program leading to the degree of Bachelor of Science in Business Administration. Students are familiarized with the basic concepts of business administration and given training in the use of the fundamental tools of management common to the private and the public sectors of the economy. The course of study combines a strong professional program in business areas with a comprehensive background in liberal arts.

The liberal arts program is essential to the student's development as an educated man conversant with the principal currents of thought and events of the world and especially of the western world and of his American heritage. In addition to furthering the development of a social conscience this program enables the student to view business against the broader background of society's affairs.

Admission Requirements

An applicant for admission to the Business Administration Programs should be a graduate of an approved secondary school. While no set program of high school subjects is prescribed, an applicant must meet the standards of the College in respect to the high school average and present 15 acceptable units of satisfactory work, including 9 or more units (4 in English) of college preparatory subjects. Satisfactory scores on College Entrance Examination Board Tests (S.A.T.), or American College Testing Program Tests (A.C.T.) are required. All students will receive placement examinations in mathematics. Non-college-credit courses are available to remedy deficiencies.

Matriculation for Bachelor Degree Students who have completed at least two semesters or equivalent (30 academic credit hours) with a minimum quality point average of 2.00 may apply for matriculation for the Bachelor Degree.

Admission will be limited to applicants who have given evidence of capacity and motivation adequate for upper division work as determined by the Department Chairman.

A minimum cumulative quality point average of 2.00 must be attained for graduation in School of Business Administration required courses and departmental major required courses.

Requirements for the Degree

(General Management, Operations Management, Marketing, Economics, Accounting, Public Administration majors.)

Of the total 126 semester hours required for graduation 60 semester hours are in business courses and 66 semester hours are in liberal arts courses. See Business—Table I for the required business core courses and the designated liberal arts courses.

The student will select 18 hours of elective courses in the liberal arts. A student contemplating attendance at a graduate school would be well advised to attain a foreign language competency equal to a second year college course.

The School of Business Administration considers it axiomatic that a graduate is better prepared when his collegiate business background has been comprehensive than when his work has been highly specialized. Consequently only a limited amount of specialization is permitted in the departmental majors of general management, operations management, marketing, public and social administration and economics. Somewhat more specialization is permitted in accounting because of circumstances specific to this field. Each of the majors, with the exception of accounting, has a 12 s.h. requirement. An additional 3 s.h. in the major is permitted in selecting 18 s.h. of business electives.

The business student with special interest in computers and data processing will ordinarily major in Operations Management. However, such training can also be combined with another major, e.g., General Management or Marketing, by the judicious selection of electives.

The departmental requirements for majors comprise the courses listed below which will be taken during the junior and senior years. The departmental requirements plus the business electives result in the student taking three business courses in each of his last four semesters plus the liberal arts courses designated in Business—Table I.

General Management Industrial Relations, Risk and Insurance, Advanced Statistics, Financial Management.

Operations Management Cost Control, Production Control, Operations Research, Systems Analysis.

Marketing Advertising and Promotion, Marketing Management, Marketing Research, International Business.

Economics Money and Banking, Government Regulation of Business, Economics of Labor Relations, Intermediate Economic Analysis.

Accounting Intermediate Accounting I and II, Advanced Accounting I and II, Cost Accounting I and II, Auditing I, Income Tax Procedure I.

Public Administration Public Administration, Public Finance, and either Municipal Government, and Systems Analysis or Social Administration I and II.

Business electives will be chosen in consultation with the student's advisor. Eighteen semester hours will be selected, of which three semester hours may be in the student's major field. The accounting major will have 6 semester hours of unrestricted business electives. The term *business electives* means all courses listed in the School of Business Administration other than the business core courses and the required courses in the student's major. All courses offered by the Department of Economics are included.

Because of the increasing use of mathematics in the quantitative treatment of business matters and because of the emphasis on mathematics in the graduate schools, some advanced work in mathematics may be selected by the student as part of his business electives.

The courses offered by the respective business departments in addition to business core and major required courses are the following:

General Management Business Law II, Physical Distribution Management.

Operations Management Business Games, Programming.

Marketing Retailing, Sales Management, Industrial Marketing.

Economics See under Economics elsewhere in this catalog.

Accounting Auditing II, Income Tax Procedure II.

Public and Social Administration Internship I and II, Minority Groups, Urban Sociology.

Associate in Science Successful completion of the first two years of the business program with a minimum quality point average of 2.00 qualifies the student for the Associate in Science in Business Administration diploma.

All business students follow similar programs for the first two years (4 semesters). The pattern for the last 4 semesters is also indicated.

Business — Table I

	BUSINESS			LIBERAL ARTS		
	Required		Sem. Hrs.	Required		Sem. Hrs.
1st Sem.	BA 101	Tech. Data Process.	3	E 113	English Comp.	3
	IE 105	Legal Concepts	3	EC 133	Prin. of Eco. I	3
				M 115	Math Anal. I	3
				PE 111	Physical Ed. I	0
2nd Sem.	BA 105	Prin. of Mktg.	3	E 206	Comp. & Literature	3
	BA 125	Mgmt. & Org.	3	EC 134	Prin. of Eco. II	3
				M 116	Math Anal. II	3
				PE 112	Physical Ed. II	0
3rd Sem.	A 111	Intro. Acctg.	3	PS 121	American Government	3
	BA 216	Statistics	3	SC 111	**Physical Science	3
				SS 113	Sociology	3
4th Sem.	A 112	Intro. Acctg.	3	P 111	Psychology	3
	BA 113	Business Finance	3	PHL 111	Intro. Prob. Phil.	3
				SC 112	**Physical Science	3
5th Sem.		Major	3	E 201	*World Literature I	3
		Major	3	HS 111	Western Civilization	3
		Business Elective	3		Liberal Arts Elective	3
6th Sem.		Major	3	E 202	*World Literature II	3
		Business Elective	3	HS 112	Western Civ. II	3
		Business Elective	3		Liberal Arts Elective	3
7th Sem.	BA 510	Managerial Economics	3		Liberal Arts Elective	3
		Major	3		Liberal Arts Elective	3
8th Sem.	BA 512	Seminar	3		Liberal Arts Elective	3
		Business Elective	3		Liberal Arts Elective	3
		Business Elective	3		Liberal Arts Elective	3

*or E 211-212 Survey of Eng. Lit.
or E 213-214 Survey of Am. Lit.

**or other two semester 6 credit science course

Social Administration

The Social Administration major is a program designed to prepare the student to enter the field of social welfare or to continue on to social work graduate school. The program is based on a Liberal Arts core with courses in the major which give the student an understanding of society and the social work profession. Through course work and practical experience the student is helped to understand how social work is utilized to meet the needs of society. Business—Table II presents the program that the student will follow. The elective courses will be selected in consultation with the departmental chairman.

Business — Table II

SOCIAL ADMINISTRATION

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
	First Year				
E 113	English Composition	3	E 206	English Comp. & Lit.	3
HS 111	Western Civilization I	3	HS 112	Western Civilization II	3
M 115	Math Analysis I	3	M 116	Math Analysis II	3
	Foreign Language	3		Foreign Language	3
	Literature	3		Literature	3
PE 111	Physical Education I	0	PE 112	Physical Education II	0
	Total	15		Total	15
	Second Year				
P 111	Psychology	3	P 336	Abnormal Psychology	3
SS 113	Sociology	3	SS 114	Problems in Sociology	3
	Philosophy Elective	3		Fine Arts Elective	3
	Science Elective	3		Science Elective	3
	Elective	3		Elective	3
	Total	15		Total	15
	Third Year				
BA 216	Statistics	3	P 321	Social Psychology	3
SA 400	Minority Group Relations	3	PS 121	American Government	3
	Fine Arts Elective	3		Fine Arts Elective	3
	Electives	6		Electives	6
	Total	15		Total	15
	Fourth Year				
SA 301	Social Administration I	0	SA 302	Social Administration II	3
	Elective—Internship or Urban Soc.	3	SA 512	Research Seminar	3
	Electives	9		Electives	9
	Total	15		Total	15

Law Enforcement Program

Bachelor Degree Program A four year bachelor degree program in law enforcement is offered as an option under the Public and Social Administration Major. It is planned for high school graduates interested in any of the many careers in the administration and operation of criminal justice. These may be in state, local, or federal services or in private investigation or security forces.

Two options are provided in this program. The first is in Law Enforcement—Administration. The supervision of law enforcement is largely concerned with the activities and behavior of people in terms of maintaining law and order, providing needed services, and protecting life and property. The program provides the basic studies in the liberal arts and business administration with the required courses in the administration of law enforcement to prepare the individual for a management career in this field. See Business—Table III. The second is in Law Enforcement—Science. It includes a strong emphasis on chemistry, mathematics, and physics as well as the forensic laboratory techniques directly related to criminal investigation and identification. The basic liberal arts studies are again included. See Business—Table IV.

Associate Degree Program Successful completion of the first two years of the Law Enforcement Program with a minimum quality point average of 2.00 qualifies the student for the Associate in Science in Law Enforcement.

Business — Table III

LAW ENFORCEMENT — ADMINISTRATION

FIRST YEAR

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
E 113	English Compositon	3	E 206	Eng. Comp. & Literature	3
PA 103	Police Org. & Admin. I	3	PA 104	Police Org. & Admin. II	3
P 111	Psychology	3	SC 122	Biology II	3
SC 121	Biology I	3	SC 132	Biology Lab	1
SC 131	Biology Lab	1	SS 113	Sociology	3
	Elective (Restricted)	3		Elective (Restricted)	3
PE 111	Physical Education I	0	PE 112	Physical Education II	0
	Total	16		Total	16

SECOND YEAR

PA 106	Police Supervision	3	PA 201	Intro. to Forensic Science	3
PA 215	Prin. of Investigation	3	PA 218	Amer. Legal System II	3
PH 217	American Legal System I	3	PA 221	Juvenile Delinquency	3
PS 121	American Government	3	PS 122	State & Local Govt.	3
	Language (Elective)	3		Language (Elective)	3
	Total	15		Total	15

THIRD YEAR

EC 133	Economics I	3	EC 314	Public Finance	3
P 336	Abnormal Psychology	3	IE 507	Systems Analysis	3
PA 311	Criminology	3	PHL 124	Logic & Scientific Meth.	3
PS 302	U. S. Constitution	3	SA 211	Prin. of Public Admin.	3
	Elective	3		Elective	3
	Total	15		Total	15

FOURTH YEAR

IE 105	Tech. Data Process	3	A 113	Industrial Accounting	3
PS 216	Municipal Govt.	3	PA 401	Police Prob. Seminar	3
SA 400	Minority Group Relations	3	PA 402	Police-Community Rel.	3
SA 410	Urban Sociology	3		Elective	3
	Elective	3		*Internship OR Elective	3
	Total	15		Total	15

* Internship is only for students who have had no practical experience in Law Enforcement.

Total required for the Bachelor of Science degree — 122 semester hours.

Business — Table IV

LAW ENFORCEMENT — SCIENCE

FIRST YEAR

	Fall	Sem. Hrs.		Spring	Sem. Hrs.
E 113	English Composition	3	E 206	Eng. Comp. & Lit.	3
PA 103	Police Organ. & Admin. I	3	PA 104	Police Org. & Admin. II	3
PS 121	American Govt.	3	PS 122	State & Local Govt.	3
SC 121	Biology I	3	SC 122	Biology II	3
SC 131	Biology Lab	1	SC 132	Biology Lab	1
	Elective	3		Elective	3
PE 111	Physical Education I	0	PE 112	Physical Education II	0
	Total	16		Total	16

SECOND YEAR

	Fall	Sem. Hrs.		Spring	Sem. Hrs.
CH 105	Gen. Chemistry I	3	CH 106	Gen. Chemistry II	3
	Chemistry Lab	1		Chemistry Lab	1
M 115	Math Analysis I	3	M 116	Math Analysis II	3
P 111	Psychology	3	PA 218	Amer. Legal System II	3
PA 106	Police Supervision	3	SS 113	Sociology	3
PA 217	Amer. Legal System I	3		Elective	3
	Total	16		Total	16

THIRD YEAR

	Fall	Sem. Hrs.		Spring	Sem. Hrs.
P 336	Abnormal Psychology	3	PA 201	Intro. Forensic Science	3
PA 215	Prin. of Investigation	3	PA 311	Criminology	3
PA 221	Juvenile Delinquency	3	PH 202	Gen. Physics II with Lab	3
PH 201	Gen. Physics I with Lab.	3	PHL 124	Logic & Scientific Method	3
	Elective	3		Elective	3
	Total	15		Total	15

FOURTH YEAR

	Fall	Sem. Hrs.		Spring	Sem. Hrs.
IE 105	Tech. Data Processing	3	IE 507	Systems Analysis	3
PA 303	Forensic Lab. I	3	PA 304	Forensic Lab II	3
PS 302	U. S. Constitution	3	PA 401	Police Problems Seminar	3
SA 410	Urban Sociology	3	PA 402	Police-Com. Relations	3
	Elective	3		*Internship OR Elective	3
	Total	15		Total	15

* Internship is only for students who have had no practical experience in Law Enforcement.

Total required for the Bachelor of Science degree — 124 semester hours.

School of Engineering

Thomas C. Warner, Jr., Dean

Offering the Degree Bachelor of Science in:

- Electrical Engineering
- Industrial Engineering
- Mechanical Engineering

Offering the Degree Associate in Science in:

- Engineering

School of Engineering

Admission Requirements

An applicant for admission to the Engineering Programs should be a graduate of a secondary school of approved standing and should present 15 acceptable units of secondary school work. These should include 4 units of English, 2 units of algebra, 1 of plane geometry, ½ of trigonometry, and 1 unit each of physics and a second science.

Deficiencies in English, mathematics, and/or science may be satisfied by summer school attendance, or by an extension of the stated curriculum for one or two semesters chosen to fit the student's need.

Satisfactory placement in tests covering scholastic aptitude, mathematics, and English, as given by the College Entrance Examination Board (S.A.T.), or American College Testing Program (A.C.T.), is required.

Matriculation for Bachelor's Degree Students who have completed at least two semesters or equivalent (30 academic credit hours) with a minimum quality point average of 2.00 may apply for matriculation for the Bachelor's Degree.

Admission will be limited to applicants who have given evidence of capacity and motivation adequate for upper division work as determined by the Chairman of the Department.

A cumulative quality point ratio of at least 2.00 is required in a Bachelor of Science student's major field.

Electrical Engineering Bachelor of Science Program: This program is planned to give students a sound foundation for a professional career in the utilization of electricity in the modern industrial world and in the fields of experimental science and technology. The training includes not only mathematics, mechanics, physics and chemistry, but also economics and other liberal arts subjects. The student becomes familiar with the calculation of circuits of electric, magnetic and dielectric types, theory of generators, motors, magnets and other apparatus, electrical transmission of energy, automation, semiconductors, electronic computers, information theory, microwaves, and related subjects. A great future is open in research in varied areas including the concentrated application of engineering principles to improved productivity and reduction in human drudgery. Upon satisfactory completion of the prescribed four-year curriculum, graduating students receive the Bachelor of Science degree in Electrical Engineering.

Industrial Engineering Bachelor of Science Program: The study of Industrial Engineering prepares a student for a successful career in the manufacturing, research and service industries. Based as it is on a broad engineering background, the professional program taken in the last two years offers a perspective which enables the graduate to cope with complex problem situations encountered in modern industry. Special attention is given to preparing the student for the intelligent use of computers in modern industrial practice. Upon satisfactory completion of the prescribed four-year curriculum, graduates will receive the Bachelor of Science degree in Industrial Engineering.

Mechanical Engineering Bachelor of Science Program: The tremendously broad field of mechanical engineering requires a common core of fundamental knowledge which is covered in the courses in this major. Thermodynamics, Heat Transfer, Fluid Mechanics, Dynamics and Vibrations, Machine Design, and extensive laboratory work are typical elements of this core. Sufficient latitude is granted for the student to include several related courses of his own choosing in his senior year. Special attention is given to developing the student's ability to analyze, design, and prove by testing techniques in various mechanical applications. Upon satisfactory completion of the prescribed four-year curriculum, graduates will receive the Bachelor of Science degree in Mechanical Engineering.

Associate in Science This program provides students with the first two years of a standard four-year engineering program. It enables the young man or woman to live at home, thus eliminating the on-campus expenses of room and board. Since New Haven College courses are accredited, the student will be in a position to transfer with advanced standing to the four-year Bachelor program, to the Evening Credit Division of the College, or to another institution. Upon satisfactory completion of the prescribed two-year curriculum, graduates will receive the Associate in Science degree.

ASSOCIATE IN SCIENCE PROGRAMS

(Core Requirements for all majors—BS and AS)

FIRST YEAR

	Fall	*Sem. Hrs.*	*Lab. Hrs.*	*Class Hrs.*
E 113	English Composition	3	0	3
M 117	Calculus I	3	0	3
*HS 111	Western Civilization I	3	0	3
EC 133	Principles of Economics I	3	0	3
IE 102	Introduction to Computers	3	0	3
PE 111	Physical Education I	0	0	2
		15	0	17

	Spring	*Sem. Hrs.*	*Lab. Hrs.*	*Class Hrs.*
E 201	World Literature I	3	0	3
*HS 112	Western Civilization II	3	0	3
M 118	Calculus II	3	0	3
CH 105	Chemistry w/Lab.	4	3	3
PH 108	Physics I	3	3	2
PE 111	Physical Education II	0	0	2
		16	6	16

SECOND YEAR

	Fall	*Sem. Hrs.*	*Lab. Hrs.*	*Class Hrs.*
M 203	Calculus III	3	0	3
PH 209	Physics II	3	3	2
ME 201	Statics	3	0	3
E 202	World Literature II	3	0	3
EE 223	Principles of Electrical Engineering I	3	0	3
		15	3	14

	Spring	*Sem. Hrs.*	*Lab. Hrs.*	*Class Hrs.*
M 204	Differential Equations	3	0	3
PH 210	Physics III	3	3	2
ME 202	Mechanics of Materials I	3	3	2
ME 204	Dynamics	3	0	3
EE 224	Principles of Electrical Engineering II	3	0	3
IE 204	Engineering Economics	3	0	3
		18	6	16

* Students may substitute two semesters from another General Studies area, such as Psychology, Philosophy, Sociology, Political Science, etc.

TOTAL — Associate in Science Degree in Engineering: 64 Semester Hours.

BACHELOR OF SCIENCE PROGRAMS

ELECTRICAL ENGINEERING

Third Year

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
EE 331	A. C. Circuits I	3	EE 332	A. C. Circuits II	3
EE 343	Elec. Machines I	3	EE 348	Electronic Dev. II	3
EE 347	Electronic Dev. I	3	EE 349-50	Electronics Lab	2
EE 351	Elec. Systems Analysis	3		Electives, Restricted	6
EE 353-4	Elec. Machines Lab	2		Elective, Gen. Studies	3
M 303	Adv. Calculus	3			
	Total	17		Total	17

Fourth Year

EE 461	Electromagnetic Theory	3		Elective, Gen. Studies	3
	Elective, Free	3		Elective, Free	3
	Electives, Restricted	9		Electives, Restricted	9
	Total	15		Total	15

Selection of Electives

Restricted Electives shall be from Engineering or Science and are to be chosen in consultation with department members and must be approved by the Chairman of the Department of Electrical Engineering.

TOTAL — Bachelor of Science Degree in Electrical Engineering: 128 Semester Hours Minimum

INDUSTRIAL ENGINEERING

Third Year

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
IE 214	Management Theory	3	A 113	Industrial Accounting	3
IE 243	Work Analysis	3	IE 234	Production Control	3
IE 346	Statistical Analysis	3	IE 502	Operations Research	3
	Electives, Restricted	6		Electives, Restricted	9
	Total	15		Total	18

Fourth Year

IE 233	Cost Control	3			
EC 350	Economics of Labor Relations	3	IE 504	Laboratory Thesis	4
	*Math Elective	3		Elective, Free	3
	Elective, General Studies	3		Elective, General Studies	3
	Elective, Restricted	3		Electives, Restricted	6
	Total	15		Total	16

* IE 347 Probability Analysis, M 231 Linear Algebra or any 300 or 400 series math course.

Selection of Electives

Restricted electives are to be chosen in consultation with department members and must be approved by the Chairman of the Department of Industrial Engineering. Students may secure restricted elective guide sheets from the Reception Office or from the department chairman.

TOTAL — Bachelor of Science Degree in Industrial Engineering: 128 Semester Hours Minimum

MECHANICAL ENGINEERING

THIRD YEAR

	Fall	*Sem. Hrs.*		*Spring*	*Sem. Hrs.*
ME 301	Thermodynamics I	3	ME 302	Thermodynamics II	3
ME 344	Mech. of Vibrations	3	ME 311	Machine Elements	3
	Elective, Math	3	ME 315	M. E. Lab I	2
	Elective, General Studies	3	ME 321	Fluid Mech.	3
	Elective, Restricted	3		Elective, General Studies	3
	Total	15		Elective, Restricted	3
				Total	17
MT 219	Physical Metallurgy	3	ME 415	M. E. Lab II	2
	Elective, Free	3		Elective, Free	3
	Electives, Restricted	9		Electives, Restricted	12
	Total	15		Total	17

Selection of Electives

Each student will meet with the Chairman of the Mechanical Engineering Department during the Spring Semester of his Second year, in order to define the program the student will follow his last two years. At this meeting a Faculty member will be assigned to act as an adviser to the student during the final two years. The adviser will assist the student in the selection of electives that will result in a program of study that will be of maximum benefit to the student.

Students interested in the fields of Materials and Metallurgy and/or Civil Engineering may obtain permission from the Chairman of the Mechanical Engineering Department to take available courses in these areas for the Restricted Electives indicated above.

TOTAL — Bachelor of Science Degree in Mechanical Engineering: 128 Semester Hours Minimum

Description of Courses

Accounting

William G. Holman, Chairman

A 111-112. Introductory Accounting. Credit, 6 semester hours.

Prerequisite to all other courses in accounting.

Offered also in Spring Semester on a two nights per week basis.

Familiarizes the student with fundamental principles of accounting. Supplemented by progress tests, problems, and systematic practice work. Interpretation of assets, liabilities, and net worth; preparation of statements; books of original entry; ledgers; and work at the end of a fiscal period.

A 113. Industrial Accounting. Credit, 3 semester hours.

Open only to Arts and Sciences, Engineering and Law Enforcement students.

Acquaints students with the vocabulary of accounting, the accounting cycle, and the presentation of accounting statements.

A 221-222. Intermediate Accounting. Credit, 6 semester hours.

Prerequisite: A 112.

Continuation at a more advanced level of the principles studied in Introductory Accounting. Adapted to present-day changes in the accounting profession. The corporation, asset valuations, liabilities, installment sales and consignments, analysis and interpretation of financial statements, sources and application of funds, depreciation methods, inventory evaluation, reserves, and surplus analysis. Considerable practice in the form of problem solutions. Reference made to the publications of the professional accounting societies.

A 223-224. Cost Accounting. Credit, 6 semester hours.

Prerequisite: A 112.

Cost concepts, classifications, and systems from the point of view of cost determination (accumulation of material, labor, and overhead by jobs, processes, etc.), cost control (budgets, standards, etc. compared to actuals), and cost analysis and reporting for intelligent management decisions. Differential and comparative cost analysis, break-even analysis, capital expenditure planning, and internal profit measurements and pricing policies.

A 331-332. Advanced Accounting. Credit, 6 semester hours.

Prerequisite: A 222.

Final general accounting course covering all phases of accounting not previously covered and not considered of a specialized nature. Given in two sections, neither section being dependent upon the other. Upon completion of these sections, the student is prepared for advanced study in specialized accounting problems.

A 333. Auditing I. Credit, 3 semester hours.

Prerequisite: A 222.

Evaluation of the effectiveness of the various accounting systems and procedures as they relate to internal control. Auditing procedures to test reliability are developed, followed by teachings of prerequisites that are to be met for auditing standards applicable to "field work." A practice case links the course to practice.

A 334. Auditing II. Credit, 3 semester hours.

Prerequisite: A 333.

Introduction to the profession of auditors (internal and independent). The intricacies and the variety of audit report presentations. Full coverage of auditing standards and the latest developments in the field of auditing. Principles of internal control questionnaire and audit program designs.

A 335. Income Tax Procedures I. Credit, 3 semester hours.

Prerequisite: A 112.

The law and the procedures for individual income tax returns. Includes the determination of gross income, ordinary gains and losses, capital gains and losses, dividends, deductions of all kinds, and withholding.

A 336. Income Tax Procedures II. Credit, 3 semester hours.

Prerequisite: A 335.

Continuation of the law and procedures to cover installment sales, inventories, accounting etc., and handling taxes of partnerships, estates and trusts, and corporations, including reorganizations, personal holding companies, etc. Processes of filing returns, paying taxes, and getting refunds. Coverage of Social Security, Federal Estate and Gift taxes.

Art

John Collinson, Dean, Arts and Sciences

ART 101-102. Drawing and Painting I and II. Credit, 6 semester hours.

Fundamentals of drawing and painting. Problems in drawing alternate throughout the year with painting projects. Exercises to develop coordination of hand and eye; drawing objects in correct perspective; study of the human figure, its volumes, shifting axes, and action. Exploitation of line as a means of articulating the structure of forms and space.

ART 111-112. Design I and II. Credit, 6 semester hours.

Visual elements of art: texture, line, color, shape, and space and the factors which affect their organization in visual design. Elementary non-representational design. The study of color.

ART 122. Layout and Printing Techniques. Credit, 3 semester hours.

Techniques of layout, lettering, and design in relation to printing methods.

ART 131. History of Art to the Renaissance. Credit, 3 semester hours.

World art as an expressive and social phenomenon from its earliest beginnings, through religious and cultural cycles, to the visual developments of the Renaissance.

ART 132. History of Modern Art. Credit, 3 semester hours.

Art of the twentieth century in Europe and America, its roots in the past, its function as an expression of our contemporary civilization.

ART 201-202. Drawing and Painting III and IV. Credit, 6 semester hours.

Prerequisite: Art 102.

Continuation of Drawing and Painting I and II. Perfection of techniques.

ART 203 Commercial Art I. Credit, 3 semester hours.

Problems of graphic arts and advertising. Relations between the arts and methods of communication. An introduction to the fields of advertising, illustration, and editorial art; the role of the advertising agency; and the analysis of ideas for visual statement.

ART 204. Commercial Art II. Credit, 3 semester hours.

Prerequisite: Art 203.

The organization and presentation of a project which demonstrates the student's ability to apply theory on a professional level. Work for presentation in the form of a portfolio is developed through individual instruction and criticism.

ART 211. Lettering. Credit, 3 semester hours.

Prerequisite: Art 111.

Design and execution of basic hand lettering with pen and brush; the utilization of hand lettering and type in the design of printed matter; the use of letter forms as an element of visual design.

Business Administration

Warren J. Smith, Chairman, General Management
Robert G. Leonard, Chairman, Marketing and Operations Management

BA 101. Legal Concepts. Credit, 3 semester hours.

Contract law as a foundation for anticipating legal difficulties and for making the best use of legal advice. Functional and policy problems in the legal resolution of a controversy. The origin and development of common, statutory, and constitutional law and of the functioning of the judicial system.

BA 102. Business Law. Credit, 3 semester hours.

Agency, partnerships, corporations, and legal aspects of marketing.

BA 105. Principles of Marketing. Credit, 3 semester hours.

The fundamental functions of marketing involving the basic principles of the flow of goods and services from producer to consumer. Marketing methods, policies, and problems of the manufacturer, wholesaler and retail dealer are reviewed through analysis of channels of distribution, price policies, competition, and market information.

BA 107. Advertising and Promotion. Credit, 3 semester hours.

Prerequisite: BA 105 or equivalent.

The design, management and evaluation of the various communications programs involved in marketing and public relations.

BA 113. Business Finance. Credit, 3 semester hours.

Brief study of the unincorporated business enterprise. The modern corporation. Basic security types of stocks and bonds, capital structure, promotion, investment, banking, government regulation, administration, sources and uses of working capital, expansion, combinations, mergers, refinancing and recapitalization, failure and reorganization.

BA 125. Management and Organization. Credit, 3 semester hours.

The business organization, stressing the conceptual foundations of business. Ethical and behavioral issues in organizing. The authority, responsibility, and accountability in organization and management which underlie businesses of every legal form.

BA 203. Physical Distribution Management. Credit, 3 semester hours.

Prerequisite: Junior standing.

Planning, organization, management, and operation of logistics systems with emphasis on the effective use of transportation to meet the objectives of a business.

BA 216. Statistics. Credit, 3 semester hours.

Prerequisites: M 116 or equivalent.

Statistical populations, parameters for decision, sample selection and distribution, probability theory, risk and uncertainty in estimation and testing problems, data flow, and error and bias occurring in sampling.

BA 227. Risk and Insurance. Credit, 3 semester hours.

The importance of risk in business affairs; risk situations analyzed; the different methods of meeting risk considered; extended consideration given to the various forms of insurance coverage.

BA 229. Financial Management. Credit, 3 semester hours.

Prerequisite: BA 113.

Analytical techniques for dealing with financial problems and their application to corporate financial management. Capital budgeting, cost of funds, capital structure, valuation, and some aspects of investment problems.

BA 231. Industrial Relations. Credit, 3 semester hours.

Prerequisite: BA 125.

Human factors in the management function including union-management relations, history of human relations, individual and group productivity, the company, and the community.

BA 301. Retailing. Credit, 3 semester hours.

Prerequisite: BA 105.

Modern merchandising methods used by retail stores, including store organization, buying, pricing, receiving, marketing, publicity, selling, record keeping, and stock control.

BA 302. Industrial Marketing. Credit, 3 semester hours.

Prerequisite: BA 105.

Practices and policies in the distribution of industrial goods, including purchasing practices, market analysis, channels of distribution, distribution and pricing policies, competitive practices, and operating costs.

BA 312. International Business. Credit, 3 semester hours.

Prerequisite: BA 105.

Principles of International Marketing; the theory of trade and commercial policy; foreign exchange rates, exchange control, and foreign investments; world trade in commodities; methods of exporting and importing; and an evaluation of comparative distribution systems.

BA 315. Marketing Management. Credit, 3 semester hours.

Prerequisite: BA 105.

Policies, practices, and problems in the field of marketing management; product development; product planning for promotion; market investigation, quantitative and qualitative; pricing and price policies; planning the marketing effort; and control of marketing operations.

BA 316. Sales Management. Credit, 3 semester hours.

Prerequisite: BA 105.

The problems and resulting policies encountered in the management of a sales organization. The qualifications and the duties of the sales manager; departmental organization; recruiting, selecting, training, stimulating, supervising, compensating, and routing salesmen; and territories, quotas, expenses, promotion, and policies.

BA 333. Applied Statistics. Credit, 3 semester hours.

Prerequisite: BA 216.

Quantitative analysis of business problems, development and testing of statistical inferences, and Bayes' theorem to revise probabilities in the light of information obtained from statistical studies.

BA 342. Marketing Research. Credit, 3 semester hours.

Prerequisites: BA 105 and BA 216.

The use of qualitative and quantitative analysis of the markets in which business operates. Sales analysis, advertising research, product planning and analysis, sources of data and methods of their collection, sampling techniques, methods of tabulation and analysis, methods of organizing and conducting marketing research, budget considerations, etc. with outside readings and term reports.

BA 510. Managerial Economics. Credit, 3 semester hours.

Prerequisite: Senior standing.

Integrates principles and concepts from the several business and economic fields to exemplify decision processes and strategies applicable to the management of the individual firm.

BA 512. Seminar. Credit, 3 semester hours.

Prerequisite: Senior standing.

Each participant will develop a scholarly paper involving independent study and research under faculty guidance.

Chemistry

William H. Nyce, Chairman

CH 103. Introduction to General Chemistry w/Lab. Credit, 3 semester hours.

Cannot be taken for credit by science and engineering majors.

Introductory course in inorganic chemistry dealing with elements, compounds, reactions, atomic structure, chemical bonding, solutions, and nuclear reactions. The laboratory work involves weighing and experiments related to the material covered in the lectures.

Laboratory and Breakage Fee: $15.00.

CH 105. General Chemistry I w/Lab. Credit, 4 semester hours.

Prerequisite: CH 103 or one high school unit of chemistry, or written qualifying examination.

Application of nuclear reactions, thermochemistry, electrochemistry, the production and properties of metals, the properties of the halogen and sulfur groups, and organic chemistry. Laboratory work will be related to the material covered.

Laboratory and Breakage Fee: $15.00.

CH 106. General Chemistry II w/Lab. Credit, 4 semester hours.

Prerequisite: CH 105.

Chemical equilibria, chemical bonding, solutions, chemical structure, kinetic theory, and coordination chemistry. Laboratory work includes some experiments in qualitative analysis and other experiments related to the subjects in the curriculum.

Laboratory and Breakage Fee: $15.00.

CH 211. Quantitative Analysis w/Lab. Credit, 4 semester hours.

Prerequisite: CH 106.

Theory and laboratory training in the preparation of solutions, volumetric and gravimetric analysis, and the use of special laboratory instruments.

Laboratory and Breakage Fee: $15.00.

CH 301-302. Organic Chemistry w/Lab. Credit, 8 semester hours.

Prerequisite: CH 106.

Resonance and molecular orbital theory, and basic organic reactions as they apply to synthetic procedures.

Laboratory and Breakage Fee: $15.00 per semester.

CH 321-322. Plastics and Polymer Chemistry. Credit, 6 semester hours.

Prerequisites: CH 106, CH 302.

All phases of the plastics and polymers field, including the chemistry involved, methods, properties of the plastics, and uses of the various materials.

CH 341. Instrumental Methods of Analysis w/Lab. Credit, 4 semester hours.

Prerequisites: CH 106, CH 211.

Theory of instrumental methods such as colorimetry, spectrophotometry, chromatography, and polarography. The demonstration of various instrumental methods.

Laboratory and Breakage Fee: $15.00.

CH 351. Qualitative Organic Chemistry w/Lab. Credit, 4 semester hours.

Prerequisite: CH 302.

A one-semester laboratory course dealing with the systematic identification of organic compounds.

Laboratory and Breakage Fee: $15.00.

CH 361. Nuclear and Radiochemistry. Credit, 3 semester hours.

Prerequisites: CH 106, M 117.

Natural and induced radioactivity, nuclear reactions, and the chemistry of fission products. Methods of detecting and measuring nuclear radiation. The various applications of radiochemistry in industry and the chemical effects of radiation.

CH 401-402. Advanced Organic Chemistry. Credit, 6 semester hours.

Prerequisite: CH 302.

The mechanism of organic reactions, advanced problems in synthetic organic chemistry, and special topics such as stereochemistry and photochemistry.

CH 421-422. Advanced Inorganic Chemistry w/Lab. Credit, 8 semester hours.

Prerequisite: CH 431. Corequisite: CH 432.

Modern structural concepts, reaction mechanisms, the application of principles of physical chemistry and bonding theory in inorganic chemistry.

Laboratory and Breakage Fee: $15.00 per semester.

CH 431-432. Physical Chemistry w/Lab. Credit, 8 semester hours.

Prerequisites: CH 106, PH 202, and M 203.

Fundamental laws of gases, thermodynamics, the theory of atomic and molecular structure, kinetics, and phase equilibria. Laboratory work enables the student to evaluate this subject by studying physical and chemical data.

Laboratory and Breakage Fee: $15.00 per semester.

CH 441. Analytical Chemistry w/Lab. Credit, 4 semester hours.

Prerequisite: CH 431. Corequisite: CH 432.

Application of instrumental methods to inorganic and organic methods of analysis. The instrumental methods include mass, ultraviolet and infrared spectrophotometry, chromatography, and electro-analytical analysis.

Laboratory and Breakage Fee: $15.00.

CH 451-452. Thesis for Undergraduate Chemistry Majors w/Lab. Credit, 4 semester hours.

Prerequisites: CH 302, CH 432.

An original investigation in the laboratory under the guidance of a member of the department. Oral discussion of the completed work before the staff at the end of the second semester. Final thesis report. Required for all senior majors in chemistry.

Laboratory and Breakage Fee: $15.00 per semester.

CH 511-512. Seminar I and II. Credit, 2 semester hours.

Prerequisites: CH 302, CH 432.

Reports and discusions in various fields of chemistry reviewed by students and staff.

Plant Visitations. Credit, none.

Open to junior and senior chemistry majors. Visits to plants in the area to investigate plant and laboratory facilities in the chemical industry.

SC 411-412. Biochemistry w/Lab. Credit, 8 semester hours.

(See under Science.)

Civil Engineering

John C. Martin, Coordinator

CE 303. Steel Design and Construction. Credit, 3 semester hours.

Prerequisites: M 203 and ME 202.

Analysis, design and construction of steel structures. Design of frames, members, connections and other related topics. Tension members, compression members, beams, girders, trusses and rigid frames. Fabrication and erection, including shop practice.

CE 304. Geology and Soil Mechanics. Credit, 3 semester hours.

Prerequisites: M 203 and ME 202.

Structural composition of the earth's crust and the mechanics of its formation. Soil classifications and physical properties are related to the principles underlying the behavior of soils subjected to various loading conditions. Subsurface exploration and typical foundation problems are included.

CE 314. Concrete Design and Construction. Credit, 3 semester hours.

Prerequisites: M204 and ME 307.

Analysis, design and construction of both plain and reinforced concrete. Design, utilizing both working stress and ultimate strength techniques, of beams, slabs, columns, footings and retaining walls. Construction methods, including forming, reinforcing, concrete placing and pre-casting will be described.

Economics

Phillip S. Kaplan, Chairman

EC 133. Principles of Economics I. Credit, 3 semester hours.

The foundations of economic analysis, including economic progress; resources, technology, private enterprise, profits and the price system. Macroeconomics including national income, employment and economic growth. Price levels, money and banking, the Federal Reserve System, theory of income, employment and prices, business cycles and problems of monetary, fiscal, and stabilization policy.

EC 134. Principles of Economics II. Credit, 3 semester hours.

Prerequisite: EC 133.

Microeconomics including markets and market structure and the allocation of resources. The distribution of income, the public economy, the international economy, and current economic problems.

EC 300. Economic History of the U. S. Credit, 3 semester hours.

The development of American economic life in the various stages of agriculture, trade, industry, finance, and labor. The change of economic practices and institutions, particularly in business, banking, and labor. The changing role of government.

EC 310. Principles of Economic Geography. Credit, 3 semester hours.

The distribution of resources, industries, and population in relation to physical, economic and technological factors. The principles of economic location and regional development.

EC 311. Government Regulation of Business. Credit, 3 semester hours.

Prerequisites: EC 133-134.

An appraisal of public policy toward transportation, trusts, monopolies, public utilities, and other forms of government regulation of economic activity.

EC 314. Public Finance. Credit, 3 semester hours.

Prerequisites: EC 133-134.

The theory and practice of public taxation. The budgetary process at all levels of government.

EC 320. Mathematical Methods in Economics. Credit, 3 semester hours.

Prerequisites: M 115-116.

The applications of various mathematical concepts and techniques in macroeconomic and microeconomic analysis. Special emphasis on the design and interpretation of mathematical models of economic phenomena.

EC 336. Money and Banking. Credit, 3 semester hours.

Prerequisites: EC 133-134.

The nature and functions of money, commercial banking system, Federal Reserve System and the Treasury, monetary theory, financial institutions, international financial relationships, history of money and monetary policy in the United States, and current problems of monetary policy.

EC 340. Intermediate Economic Analysis. Credit, 3 semester hours.

Prerequisites: EC 133-134.

The theory of product and factor pricing in markets. The uses and limitations of some general methods of economic analysis. Recommended for students planning to take advanced-level studies in economics.

EC 342. International Economics. Credit, 3 semester hours.

Prerequisites: EC 133-134.

The role, importance, and currents of international commerce; the balance of international payments; foreign exchange and international finance; international trade theory; problems of balance of payments adjustment; trade restrictions; international control of raw materials; economic development and foreign aid.

EC 345. Comparative Economic Systems. Credit, 3 semester hours.

Prerequisites: EC 133-134.

A comparative study of the economic organization, resource allocation and growth problems of the United States, British and French economic systems and the economic systems of the U.S.S.R., Poland, and Yugoslavia.

EC 350. Economics of Labor Relations. Credit, 3 semester hours.

Prerequisites: EC 133-134.

The history of the union movement in the United States, union structure and government, problems of collective bargaining, economics of the labor market, wage theories, unemployment, governmental policy and control, problems of security.

EC 410. Econometrics. Credit, 3 semester hours.

Prerequisite: EC 320.

The application of mathematical and statistical methods to both micro- and macroeconomic policy issues.

EC 440. Economic Development. Credit, 3 semester hours.

Prerequisites: EC 133-134.

Economic problems of underdeveloped countries and the policies necessary to induce growth. Individual projects required.

EC 442. Economic Thought. Credit, 3 semester hours.

Prerequisites: EC 133-134.

The development of economic doctrine from mercantilism and Adam Smith to the thinking of modern day theorists. Emphasis is placed upon the main currents of thought with the applicability to present day problems. Individual study and reporting.

EC 445. National Income Analysis and Business Cycles. Credit, 3 semester hours.

Prerequisites: EC 133-134, EC 336.

An investigation of the make-up of the national income and an analysis of the factors that enter into its determination; the nature of economic fluctuations and a survey of theories explaining the causes of cycles in general economic activity; counter-cyclical policies; unemployment and economic growth; forecasting economic activity.

EC 450. Thesis. Credit, 3 semester hours.

The undertaking of a written report on a research project. No class meetings, but periodic conferences with the thesis supervisor. Required of all majors.

Electrical Engineering

John D. Driscoll, Chairman

EE 223-224. Principles of Electrical Engineering. Credit, 6 semester hours.

Prerequisites: PH 209 and M 203 may be taken concurrently.

Basic concepts in modern network theory and network techniques in analyzing simple and complex electric circuits. Definitions of current voltage relations, circuit elements, resistance, inductance, and capacitance. Circuit equilibrium equations, transformation, Kirchoff's laws, network theorems, passive and active networks, superposition. Thevenin and Norton's theorem, d-c transients, solution of simple electric circuits in the sinusoidal steady state by vector and complex algebra. Impedance, capacitance, and resonance concepts, single phase alternating currents and voltages, power relations. Electron devices, diodes, triodes and transistors, amplifiers, equivalent circuits, and applications. Magnetic fields and circuits, electromechanical energy conversion.

EE 331-332. Alternating Current Circuits. Credit, 6 semester hours.

Prerequisites: EE 224 and M 204.

Review of basic current theory. Loop and nodal equations and methods of solution. Matrix notation. General network theorems. Input and transfer admittances, impedances and transfer functions. Symmetrical component analysis. Three-phase circuits, balanced and unbalanced. Other polyphase circuits. Fourier series and integrals. Fourier and LaPlace transforms, direct and inverse. Operational methods applied to transients in linear systems.

EE 336. Instrumentation Electronics. Credit, 3 semester hours.

Prerequisites: EE 224 and M 204.

Cannot be taken for credit by electrical engineering students.

An introduction into instrumentation electronics aiming to provide a working knowledge and understanding of electronic instruments and controls as used in industrial processes. Starting with simple electrical measurements, the course subsequently deals with power supplies, transistor and vacuum tube amplifiers, and oscillators. Practical servo systems and operational amplifiers are treated, as well as simple circuits for electronic switching, timing, and digital counting.

EE 343-344. Electrical Machines. Credit, 6 semester hours.

Prerequisites: EE 224 and EE 331-332, which may be taken concurrently.

Processes for the electro-mechanical conversion of energy. The fields, forces, and torques in magnetic systems. Theory, characteristics, applications, and design of direct-current machines. Theory, performance, and applications of transformers, AC generators, synchronous motors, single and polyphase induction motors.

EE 347-348. Electronic Devices and Circuits. Credit, 6 semester hours.

Prerequisite: EE 332, or may be taken concurrently.

Study of basic circuits making up more complex electronic systems. The first semester includes semiconductor junctions, vacuum diodes and triodes, transistors, and basic amplifier circuits. Power and audio amplifiers, high frequency circuits, and negative resistance devices analyzed in the second semester.

EE 349-350. Electronics Laboratory. Credit, 2 semester hours.

To be taken concurrently with EE 347-348.

Laboratory experiments and problems associated with circuits and devices covered in the lecture courses.

Note: Part-time students are charged for a standard 3 semester hour course.

EE 351. Electrical Systems Analysis. Credit, 3 semester hours.

Perequisites: EE 224 and M 303. (M 303 may be taken concurrently.)

A study of the analytical approach to the solution of electrical engineering problems. Review of differential equations and systems applications. Circuit response to special functions. Dual networks. Electrical analogues to mechanical systems. Fourier methods and applications in linear systems. Transfer functions and system response by LaPlace transforms. Convolution and superposition integrals.

EE 352. Advance Network Theory. Credit, 3 semester hours.

Prerequisites: EE 224 and M 203.

Introduction to the concept of matrices and their application to modern electrical circuits and system phenomena. The theory of n-port and n-terminal networks. Their synthesis and analysis from the admittance matrix viewpoint, using RLC networks, transformers, negative-immittance converters, and gyrators.

EE 353-354. Electrical Machines Laboratory. Credit, 2 semester hours.

To be taken concurrently with EE 343.

The laboratory experiments and problems cover analysis of DC and AC networks by loop and nodal equations and methods of solutions. Matrix notation. Experimental verification of network theory and its application to electrical machines.

Note: Part-time students are charged for a standard 3 semester hour course.

EE 420. Introduction to Systems Engineering. Credit, 3 semester hours.

Prerequisite: EE 351.

Systems engineering principles and practice. Probability and statistics and their application to stochastic systems. Synthesis of systems using block diagram and signal flow graph algebra. Simulation and mathematical models both deterministic and stochastic. Exterior and interior system design, single thread and high traffic theory, competitive theory. Linear programming, group dynamics, information theory. Economics evaluation and optimization of systems projects.

EE 429. Measuring Principles and Transducers. Credit, 3 semester hours.

Prerequisites: EE 336 or EE 347.

The principles of measuring elements and transducers for electrical engineers. Mechanical and industrial engineers who have the necessary prerequisites will also be able to profit from the course. An introduction to the science of measurement (Metrology) and the application of this science to the measurement of quantities of economic value in industrial, military, and scientific processes. Laboratory sessions provide the student with first-hand familiarization of the principles of the subject.

EE 437. Industrial Power Systems Engineering. Credit, 3 semester hours.

Prerequisite: EE 332.

Structure of power and distribution of systems; symmetrical components; analysis of unbalanced polyphase power systems; fault calculations; applications to problems of grounding, relaying, and unbalanced operation of apparatus.

EE 438. Electric Power Transmission. Credit, 3 semester hours.

Prerequisite: EE 437 or EE 332.

The fundamentals of electric generation, transmission, and distribution. Transient performances of non-linear characteristic circuits, and power system stability.

EE 441. Electronic Analog Computers. Credit, 3 semester hours.

Prerequisite: EE 348.

Elements of analog simulation, pulses and wave shapes, operational amplifiers, integrator, differentiator, constant multiplier and summer. Solution of first-order differential equations and higher order systems, formulating of signal flow-graphs. Application of computer to problems in engineering. Lectures supplemented with laboratory work.

EE 442. Electronic Digital Computers. Credit, 3 semester hours.

Prerequisite: EE 348.

Fundamentals of switching circuits, number systems, Boolean algebra and its use in logical design techniques, switching theorems, minimization methods, coding, error detection and correction, storage elements, sequential circuits, arithmetic operations, and system design of general purpose digital computer. Lectures supplemented with laboratory work.

E 445. Communications Theory. Credit, 3 semester hours.

Prerequisite: EE 348.

The analysis of communications circuits and the design of the components of communication systems. Signal analysis, transmission of signals, power density spectra, amplitude, and pulse modulation. Performance of communications systems, noise and information transmission theory.

EE 446. Pulse and Digital Circuits. Credit, 3 semester hours.

Prerequisite: EE 348.

A study of circuits currently used in computers and other electronic devices. Topics covered to be chosen from the following: Linear and Nonlinear waveshaping, pulse amplifiers, multivibrators, logic circuits and computer subsystems, counters, sweep oscillators, and negative resistance circuits.

EE 450. Semiconductor Electronics I. Credit, 3 semester hours.

Prerequisite: EE 347 or instructor's approval.

Structure and carrier density of semiconductors. Processes of current flow. Theory of PN junction diodes. Mechanism of current flow in junction transistors. Equivalent circuits and four terminal networks. Low frequency small signal amplifiers. Stability, high frequency circuits, power supply regulators, pulse and switching circuits. Lectures supplemented with laboratory work.

EE 451. Semiconductor Electronics II. Credit, 3 semester hours.

Prerequisite: EE 450 or instructor's approval.

Measurement of electrical quantities and parameters. Switching power supply regulators. Differential amplifiers. Operational amplifiers. Field effect transistors; analysis and design of circuits. Tunneling process. Tunnel diode and hybrid circuits. Avalanche mode switching and current mode circuits. Integrated circuits. Lectures supplemented with laboratory work.

EE 455–456. Servomechanisms and Feedback Control Systems. Credit, 6 semester hours.

Prerequisite: EE 351.

Differential equations of Physical Systems, transfer function and graphical descriptions of Linear Systems, state variable characterization of Linear Systems, equations and transfer functions of Control System Elements, General Feedback Theory, Time Domain Analysis of Feedback Control Systems, Stability of Linear Control Systems, Nyquist Criterion. Root Locus Technique, Frequency Response, design of Feedback Control Systems, introduction of Non-Linear Control Systems, simulation of control systems on the Analog Computer.

EE 461. Electromagnetic Theory. Credit, 3 semester hours.

Prerequisites: EE 351 and M 303.

Basic electromagnetic theory as related to the static fields of electric charges and the magnetic fields of steady electric currents. Fundamental field laws. Maxwell's equations, energy distributions, scalar and vector potentials, method of images, boundary relations, magnetization, polarization, time varying electric and magnetic fields, field plotting. Vector mathematics is used in the mathematical analysis.

EE 462. Microwave Fundamentals. Credit, 3 semester hours.

Prerequisite: EE 461.

The development and application of electromagnetic-field theory to the analysis of high-frequency circuits, wave propagation, reflection in various media including waveguides, and resonant cavities. The theory of operation of such devices as klystron, magnetron, and traveling wave tubes.

EE 500. Seminar in Semiconductor Electronics. Credit, 3 semester hours.

Prerequisite: Instructor's approval.

Open to Seniors in Electrical Engineering only.

Special advanced engineering problems in the semiconductor electronics field. Arranged to suit the interest and requirements of the student, under the supervision of a staff member.

EE 504. Laboratory Thesis. Credit, 3 semester hours.

Prerequisite: Instructor's approval.

Open to Seniors in Electrical Engineering only.

Advanced laboratory testing and special problems. The student works on problems of his own selection which have been approved by the instructor. The student's work may be in the form of a semester thesis or a series of original experiments.

English

Douglas Robillard, Chairman

EA. Basic Grammar. One semester. No credit.

A review of the fundamentals of English for students who do not meet the English requirements for admission to the College. Practice given in writing as well as in grammar.

EB. Reading Laboratory. One semester. No credit.

Helps the student to read faster with greater comprehension, to increase vocabulary, and to study more effectively. Supervised reading, training films, exercises and discussions.

Laboratory Fee: $5.00

EF. English for Foreign Students. One semester. No credit.

Designed for foreign-born students whose English is inadequate. Objective is to increase the student's command of English sufficiently for him to do college-level work.

E 113. English Composition. Credit, 3 semester hours.

Prerequisite: Satisfactory performance on English Placement Examination or completion of EA Basic Grammar.

Theme writing with emphasis on thematic content, paragraphing, sentence construction, grammatical principles, and diction. Reading of essays to stimulate thought and illustrate rhetorical principles.

E 114. Speech. Credit, 3 semester hours.

A disciplined approach to oral communication. Objectives are to develop proficiency in locating, organizing, and presenting material and to help the student gain confidence and fluency when speaking extemporaneously.

E 201-202. World Literature I and II. Credit, 6 semester hours.

Prerequisite: E 113.

Selected translations of non-Western literature and of Western literature from Homer to the present. Emphasis upon literary, cultural, and philosophical values.

E 206. Composition and Literature. Credit, 3 semester hours.

Prerequisite: E 113.

Further practice in theme writing. Reading of poetry, fiction, and drama in order to develop skill in analyzing and interpreting literature.

E 211-212. Survey of English Literature I and II. Credit, 6 semester hours.

Prerequisites: E 113, E 206.

Readings in English Literature from its beginnings to the present, with attention to its historical and social backgrounds.

E 213. Survey of American Literature I. Credit, 3 semester hours.

Intellectual and literary movements from Colonial times to the Civil War.

E 214. Survey of American Literature II. Credit, 3 semester hours.

Intellectual and literary movements from the Civil War to the present.

E 220. Report Writing. Credit, 3 semester hours.

Prerequisite: E 113.

Study of the standards inherent in effective reporting, both formal and informal, and of the principles of business letter writing, with practice in writing letters, memos, and reports.

E 267-268. Creative Writing. Credit, 6 semester hours.

Prerequisite: E 206 and instructor's approval.

Practice in writing the short story, poetry, drama, or non-fiction; choice of genre based upon inclination and ability of the student. Analysis of published materials and student work.

E 301. Literary Criticism and Scholarship. Credit, 3 semester hours.

Major critical theories, with readings from Plato and Aristotle to the present. Bibliographic tools and methods of research.

E 302. History of the English Language. Credit, 3 semester hours.

The development and structure of English, including its Indo-European origins and the elements of Anglo-Saxon. Major emphasis on Middle English and the transition to Modern English. Some study of the distinctive coinages of American English.

E 323. Sixteenth Century Poetry and Prose. Credit, 3 semester hours.

The social and historical backgrounds of the English Renaissance; readings in the prose writers and in Wyatt, Surrey, Spenser, Sidney, and their contemporaries.

E 326. English Drama to 1642. Credit, 3 semester hours.

The development of the English drama from its beginnings to the middle of the seventeenth century, excluding Shakespeare. Major emphasis upon the Elizabethan and Jacobean drama.

E 341-342. Shakespeare. Credit, 6 semester hours.

Introduction to representative comedies, history plays, and tragedies of Shakespeare.

E 353. Literature of the Romantic Era. Credit, 3 semester hours.

Poetry and prose of the major Romantics — Wordsworth, Coleridge, Byron, Shelley, Keats, Lamb, and Hazlitt — with attention given to the milieu of the writers, the Continental background and theories of Romanticism.

E 356. Late Nineteenth Century English Literature. Credit, 3 semester hours.

Poetry and prose from 1830-1900. The works of Tennyson, Browning, Arnold, Swinburne, Carlyle, Mill, Newman, Ruskin, and others studied in the light of the social, political, and religious problems of the period.

E 361. Modern British Literature. Credit, 3 semester hours.

British fiction, drama, and poetry from 1900 to the present. Includes works of Conrad, Joyce, Lawrence, Woolf, Huxley, Forster, Shaw, Yeats, Auden, Spender, and Dylan Thomas.

E 362. The Age of Donne and Milton. Credit, 3 semester hours.

Major writers of prose and poetry during the period 1600-1660: Donne, Milton. Burton, Bacon, Herbert and others.

E 371. Literature of the Neoclassic Era. Credit, 3 semester hours.

British writers of the period 1660-1760, with emphasis upon Dryden, Pope, Swift, Johnson, and others.

E 375. The Age of Chaucer. Credit, 3 semester hours.

A detailed reading and critical study of Chaucer's *Canterbury Tales,* with some study of his predecessors and the medieval cultural milieu.

E 390. The English Novel I. Credit, 3 semester hours.

The development of the novel in England from Defoe to Dickens and Thackeray.

E 391. The English Novel II. Credit, 3 semester hours.

The development of the novel in England from George Eliot and Hardy to the present.

E 392. Literature of the American Renaissance. Credit, 3 semester hours.

Intensive study of the writings of such figures as Emerson, Thoreau, Hawthorne, Melville, and Whitman, whose works are analyzed in the light of the influences and traditions which led to America's cultural independence.

E 402. Modern Poetry. Credit, 3 semester hours.

A study of the works of representative twentieth-century British, American, and Continental poets.

E 405. Modern Drama. Credit, 3 semester hours.

Principal movements in Continental, British, and American drama from Ibsen to the present.

E 406-409. Continental Fiction. Credit, 3 semester hours.

(One course each semester.)

Selected fiction, in translation, of the European masters, primarily Russian, French, German, or Spanish. Topic to be announced for each semester.

E 478. Contemporary American Literature. Credit, 3 semester hours.

Intensive study of developments in American fiction, poetry, and drama of our time. Readings in the works of such writers as Wolfe, Malamud, Bellow, Theodore Roethke, Robert Lowell, Arthur Miller, and Tennessee Williams.

E 491. Studies in English Literature. Credit, 3 semester hours.

Special topics in English Literature, which may include concentration upon a single figure, a group of writers, or a literary theme. Several sections, each on a different topic, may run concurrently.

E 492. Studies in American Literature. Credit, 3 semester hours.

Special topics in American Literature, which may include concentration upon a single figure, a group of writers, or a literary theme. Several sections, each on a different topic, may run concurrently.

Foreign Languages

John Collinson, Dean, Arts and Sciences

FR 101-102. Elementary French. Credit, 6 semester hours.

Stresses pronunciation, aural comprehension, and basic conversation; the fundamental principles of grammar; reading comprehension. Not open to students who offer for college entrance more than one year of high school French.

FR 201-202. Intermediate French. Credit, 6 semester hours.

Prerequisite: French 101-102 or equivalent.

Conversation based on the reading of modern prose texts; drill in written and oral self-expression; a review of the principles of grammar.

GR 101-102. Elementary German. Credit, 6 semester hours.

Stresses the fundamental principles of grammar; training in pronunciation, aural comprehension and basic conversation. Some work in the language laboratory outside of class may be required. Not open to students who offer for college entrance more than one year of high school German.

GR 201-202. Intermediate German. Credit, 6 semester hours.

For students with two years of high school German or one year of college German. Reading comprehension (some scientific texts), advanced study of grammar, composition, and oral self-expression.

RU 101-102. Elementary Russian. Credit, 6 semester hours.

Fundamental principles of grammar; training in pronunciation, aural comprehension, and basic conversation. Some work in the language laboratory outside of class may be required. Not open to students who offer for college entrance more than one year of high school Russian.

RU 201-202. Intermediate Russian. Credit, 6 semester hours.

For students with two years of high school Russian or one year of college Russian. A review and continuation of the principles of grammar, greater emphasis on reading comprehension, further drill in written and oral self-expression.

IT 101-102. Elementary Italian. Credit, 6 semester hours.

Stresses pronunciation, aural comprehension, and basic conversation; instruction in the fundamental principles of grammar; training in reading comprehension. Not open to students who offer for college entrance more than one year of high school Italian.

SP 101-102. Elementary Spanish. Credit, 6 semester hours.

Stresses pronunciation, aural comprehension, and basic conversation; instruction in the fundamental principles of grammar; training in reading comprehension. Not open to students who offer for college entrance more than one year of high school Spanish.

SP 201-202. Intermediate Spanish. Credit, 6 semester hours.

Prerequisite: SP 101-102 or equivalent.

For students with two years of high school Spanish or one year of college Spanish. Conversation, advanced study of grammar and composition. Works of prominent Spanish-American authors will be read.

History

Thomas Katsaros, Chairman

HS 111. Western Civilization I to 1700. Credit, 3 semester hours.

Western Civilization from the ancient beginnings to mid-seventeenth century. The patterns of the social, cultural and political aspects of ancient, medieval, and early modern eras that have shaped the Western tradition.

HS 112. Western Civilization II from 1700 to present. Credit, 3 semester hours.

European history from the Enlightenment to the present. Emphasis on economic and social changes, political history, the expansion of Europe and its international effects. Nationalism, imperialism, and socialism stressed.

HS 211. American History to 1865. Credit, 3 semester hours.

The development of the American nation from colonial times to 1865. Significant economic, social, political, and institutional developments.

HS 212. American History from 1865. Credit, 3 semester hours.

United States history from the Reconstruction through the contemporary era. Expanding industrialism, the changing concepts of the role of government, and the United States in world affairs.

HS 221. Comparative European Political Systems. Credit, 3 semester hours.

Prerequisites: HS 111-112.

Historical comparative approach to the political institutions of the United Kingdom, U.S.S.R., Federal Republic of Germany, and France. Emphasis on the relationship between Western and Eastern political systems.

HS 308. Social and Intellectual History of the United States. Credit, 3 semester hours.

Prerequisites: HS 211-212.

Leading ideas that have shaped important periods of American history. The colonial mind and spirit, the democratic upheaval, sectionalism—war—and reconstruction, the industrialization of the country, religion as it met the new age of science and economics, agrarian revolt, overseas possessions, the beginning of the end of isolation.

HS 310. The History of Modern England. Credit, 3 semester hours.

Prerequisites: HS 111-112.

British institutions and industrial life from 1688 to the present. Traces the movement of British society from its eighteenth-century aristocratic base through the Liberal experiment of the nineteenth- to twentieth-century collectivism; England's role in international affairs.

HS 311. American Colonial History. Credit, 3 semester hours.

Prerequisites: HS 211-212.

The European background for the discovery and colonization of the New World, and the history of the British colonies in North America until Independence. The transformation of transplanted institutions within the American environment.

HS 312. The U. S. in the Twentieth Century. Credit, 3 semester hours.

Prerequisites: HS 211-212.

Political history, social trends, and intellectual movements. Study of the expansion of the functions of government to meet modern complex problems arising from social and cultural trends and from the involvement of the United States in global politics.

HS 314. The History of Germany from 1648. Credit, 3 semester hours.

Prerequisites: HS 111-112.

From the Treaty of Westphalia to the unification of Germany, the imperial era, the two World Wars, and the rise and fall of National Socialism to the problems of divided Germany today.

HS 315. The History of Europe in the Nineteenth Century. Credit, 3 semester hours.

Prerequisites: HS 111-112.

The main political, economic, and intellectual trends in Europe in the period from 1815 to 1914. The effects of industrialism, liberalism, and socialism on European society and culture. In international affairs, the impact of nationalism on European power politics and the failure of the major powers to resolve their differences in the Balkans.

HS 317. Renaissance and Reformation. Credit, 3 semester hours.

Prerequisites: HS 111-112.

Economic, political, intellectual, and religious developments in Continental Europe from 1300 to 1650; intellectual and social change during the transition from medieval to modern times; dynastic conflicts within the emerging state system.

HS 321. The History of Ancient Greece and Rome. Credit, 3 semester hours.

Prerequisites: HS 111-112.

From the Homeric period to the year 500 A.D. Events, institutions, and ideas that have shaped the Western tradition. The political, social, economic, and cultural problems that caused the decline of these civilizations.

HS 330. History of Russia. Credit, 3 semester hours.

Prerequisites: HS 111-112.

From the thirteenth century, with particular emphasis on the transition from an agrarian to an industrial society in the period since the emancipation of the serfs in 1861. The role of the U.S.S.R. in world affairs since the Revolution of 1917; its impact upon Asia and the West.

HS 401. Europe in the Twentieth Century. Credit, 3 semester hours.

The history of Western and Central Europe since World War I viewed from the perspective of Europe's rapidly changing role in world history. Europe's political, social, and economic adjustment to the Russian Revolution and Nazism, the emergence of America and Russia as super-powers, and the loss of overseas possessions.

HS 406. Modern Japanese History. Credit, 3 semester hours.

The institutional and cultural traditions of Japan, the nature of Japan's feudal society after 1600, and the interplay of indigenous and foreign elements in the changes which affected thought, politics, and society. After the coming of Perry, the adoption and reflection of parliamentary government and the reforms that followed World War II.

HS 407. Colonial and Early Latin America. Credit, 3 semester hours.

Prerequisites: HS 111-112, 211-212.

European and Indian origins, the formation of a colonial society and culture in the sixteenth and seventeenth centuries, the background and course of anti-colonial upheaval in the early nineteenth century, the problems from the post-independence period to 1890.

HS 408. The History of Modern Latin America. Credit, 3 semester hours.

Prerequisites: HS 111-112, 211-212.

Latin America since 1890, including the distinctive histories of the major nations of Mexico, Brazil, Argentina, and Chile as well as the characteristics, problems, and prospects of the area as a whole. Inter-American relations and current revolutionary movements.

HS 409. Modern Chinese History. Credit, 3 semester hours.

The traditional society as it existed prior to the Opium War, China's confrontation with the West and its effect on political, intellectual, and economic developments. The formation and evolution of the present Chinese regime.

HS 410. A History of the Middle East. Credit, 3 semester hours.

The rise and spread of Islam and the development of an Arabic civilization. Primary attention on Turkey, Egypt, and Iran, the problems created by the Western impact on the peoples and governments of the area, the effect of the Zionist movement on Middle East politics.

HS 412. The British Empire and Commonwealth. Credit, 3 semester hours.

Prerequisites: HS 111-112.

The origins and development of the British Empire in its major areas and the emergence of the modern Commonwealth of Nations. The second part of the course will deal exclusively with Canadian history from the time of discovery to the present; stress on nineteenth- and twentieth-century developments including Canadian-United States relationships.

HS 413. A History of Africa in Modern Times. Credit, 3 semester hours.

Morocco, Algeria, Tunisia and Libya, stressing the institutional histories of these countries, which enabled them ultimately to expel European imperialism. The second part of the course deals with nineteenth-century Africa, the partition of Sub-Sahara Africa by the European powers, the period of colonial domination, and the emergence of the independent states after 1945.

HS 415. Historiography. Credit, 3 semester hours.

The development of schools of historical thought and interpretation from Thucydides to Toynbee.

HS 416. Senior Seminar. Credit, 3 semester hours.

Prerequisite: 33 semester hours in History.

Required of all liberal arts students majoring in History, in the last semester of their senior year. The undertaking of an independent study and research project presented in an oral and written form.

Industrial Engineering

Harry W. Fillman, Chairman

IE 102. Introduction to the Computer. Credit, 3 semester hours.

Prerequisites: M 002 or equivalent.

A first level course in computers for engineering and science students. An understanding of the interfacing of man, language, and computers is developed through Boolean algebra, logic theory, and soft hardware analysis. The student learns to write and debug FORTRAN IV programs via the campus computer.

Laboratory Fee: $3.00

IE 105. Technical Data Processing. Credit, 3 semester hours.

Prerequisite: M 002 or equivalent.

A first level course in computers for business, art, and social science students. An understanding is developed of the problems of interrelating the man, computer, and business systems with a data processing approach. The student learns to write and debug FORTRAN IV programs via the campus computer.

Laboratory Fee: $3.00

IE 114. Management Survey. Credit, 3 semester hours.

Introductory course in management. The major functions of industry, their interrelationship, and how they are brought together through organization. Instruction in the preliminaries of methods, cost, production control, product development, finance, physical facilities, quality control, plant engineering, industrial relations, job evaluation, sales, advertising, budgets, and records.

IE 119. Industrial Safety and Hygiene. Credit, 3 semester hours.

Prerequisite: IE 114, IE 214 or BA 125.

This is a basic course in industrial accident prevention and industrial hygiene, and covers: managerial accident prevention functions and responsibilities; injury data development, usage, and validity; machine guarding techniques and guard development, including point-of-operation drives; personal protective equipment; fire prevention and control, including flammable solvents, dusts and their characteristics; electrical hazards; hand tools, power and manual; employee training; communications; hazard analysis; accident investigation. Industrial hygiene problems caused by solvents, dusts, noise, radiation are studied, as well as regulatory bodies, laws, and catastrophe hazards.

IE 204. Engineering Economics. Credit, 3 semester hours.

Prerequisite: M 116 or M 117.

A quantitative analysis of applied economics in engineering practice; the economy study for comparing alternatives; interest formulae; quantitative methods of comparing alternatives; intangible considerations; selection and replacement economy for machines and structures; break-even and minimum cost points; depreciation; relationship of accounting to the economy study; review of current industrial practices. Promotes logical decisions through the consideration of alternative courses of action.

IE 214. Management Theory. Credit, 3 semester hours.

Prerequisite: Junior or Senior Status.

Provides insight into the elements of the managerial process and develops a rational synthesis of the mass of detail comprising the subject matter of management. Focusing largely upon the complex problems of top and middle-level management, this course investigates what managers do under given circumstances, yet stresses the on-going activities of management as part of an integrated, continuous process.

IE 223. Personnel Administration. Credit, 3 semester hours.

Prerequisite: IE 114, IE 214 or BA 125.

Provides a foundation in fundamental concepts and a general knowledge of techniques in the administration of personnel relations. The nature of personnel administration, the handling of personnel problems, employee attitudes and morale. Techniques of personnel administration: recruitment, interviews, placement, training, employee rating, as well as wage policies and administration. In order to secure breadth and depth in the approach to personnel problems, simple case studies are used at appropriate points throughout the course.

IE 224. Programming. Credit, 3 semester hours.

Prerequisites: IE 102 or IE 105; and M 115.

Introduces the student to computer programming, starting with the preparation of block diagrams, program coding, program compiling, and debugging. At least two different programming languages are learned and actual jobs programmed. The programs, written by the students, are then tested and debugged on a computer.

Laboratory Fee: $8.00.

IE 233. Cost Control. Credit, 3 semester hours.

Prerequisites: A 112 or A 113; M 115.

Basic analysis of cost control techniques. Designed to give members of the management team the underlying rudiments of cost control systems they will be using and by which they will be measured and controlled. Theory of standard costs, flexible budgeting, and overhead handling techniques emphasized by analytical problem solution.

IE 234. Production Control. Credit, 3 semester hours.

Prerequisites: IE 114, IE 214 or BA 125; and M 115.

The basic principles that govern production control in an industrial plant. These principles are worked out in the problems of procuring and controlling materials, in planning, routing, scheduling, and dispatching. Familiarizes the student with present and new methods used in this field, including O. R. techniques.

IE 243. Work Analysis. Credit, 3 semester hours.

Prerequisites: IE 114, IE 214 or BA 125; and M 115.

A course introducing the basic tools, techniques, and theory of methods, motion study, and work measurement. Various methods, analysis techniques, and charts, synthetic and watch time measurement systems, and performance rating methods are included in the course content.

IE 330. Industrial Automation. Credit, 3 semester hours.

Prerequisites: IE 102, EE 224, ME 204.

Develops the fundamental principles of automation, what automation is and how it is implemented in typical mechanical and processing industries. Topics covered include: single loop design, high traffic design, and competitive level design techniques. Tools for automation include: computers, feedback control, simulation, and digital and analog logic.

IE 344. Advanced Work Analysis. Credit, 3 semester hours.

Prerequisite: IE 243.

A course introducing advanced tools, techniques, and theory of methods, motion study, and work measurement. Micromotion study techniques, job analysis and evaluation, standard time formula construction, indirect labor standards, and wage payment plans are included in the course content.

IE 346. Statistical Analysis. Credit, 3 semester hours.

Prerequisite: M 203.

Provides an introduction to the application of statistical techniques to industrial and engineering problems, probability and distribution theory, measures of central tendency and dispersion in relation to population and samples, as well as applications of algebraic methods in industrial practice, including advanced statistical methods.

IE 347. Probability Analysis. Credit, 3 semester hours.

Prerequisite: BA 216 or IE 346.

Develops the theory of probability and related applications. Introduces such relevant areas as: combinations and permutations, probability space, laws of large numbers, random variables, conditional probability, Bayes' Theory, Markov chains, and stochastic processes.

IE 402. Numerical Controls and Methods. Credit, 3 semester hours.

Prerequisites: IE 102, ME 124, M 204.

Involves the development and evaluation of methods for computing required numerical results from given numerical data specifically oriented toward numerical controlled machines.

IE 436. Quality Control. Credit, 3 semester hours.

Prerequisite: IE 346.

Economics of quality control; modern methods used by industry to achieve quality of product; preventing defects; organizing for quality; locating chronic sources of trouble; co-ordinating specifications, manufacturing, and inspection; measuring process capability, using inspection data to regulate manufacturing processes; control charts; selection of modern sampling plans.

IE 443. Factory Planning. Credit, 3 semester hours.

Prerequisites: IE 243, IE 204.

Factors in plant location, design, and layout of equipment. The basic principles of obtaining information essential for carrying out such investigations. Survey of such practices as material handling, storage and storeroom maintenance, and use of service departments in modern factories.

IE 502. Operations Research. Credit, 3 semester hours.

Prerequisite: BA 216 or IE 346.

The Operations Research area is oriented to various mathematical and near-mathematical methods for getting answers to certain kinds of business problems. Simulation including Monte Carlo, queuing, the Flood method for assigning jobs, the transportation method, and linear programming including the simplex method with both algebraic solution and tableaus.

IE 504. Laboratory—Thesis. Credit, 3 or 4 semester hours.

Prerequisite: Senior I.E. status.

Advanced laboratory testing and special problems. The student works on problems of his own selection which have been outlined by him and have received approval. They may be in the form of a semester thesis or a series of original experiments.

IE 507. Systems Analysis. Credit, 3 semester hours.

Prerequisites: IE 114, IE 214 or BA 125; M 115; and Senior Status.

Presents the analytical and conceptual techniques upon which systems analysis and systems engineering are based and their applications in the business, engineering, and scientific fields. Development of case studies and their applications independently oriented to the student's major program.

IE 510. Business Games. Credit, 3 semester hours.

Prerequsites: IE 114, IE 214 or BA 125; and BA 216 or IE 346.

The Business Games area gives the student the opportunity of correlating his entire course of study in a management simulation framework. These training games make use of simulation models that explore specific management areas in depth. Operations research techniques of scientific management are developed. The purposes of these games are as follows: (1) to serve as a framework for training sessions in basic management principles; (2) to serve as an introduction to the problem of manufacturing management; (3) to serve as a focal point for management development discussion of long-range planning and decision assisting tools; (4) to show the student the use of modern electronic computer methods.

Journalism

John Collinson, Dean, Arts and Sciences

J 101. Journalism I. Credit, 3 semester hours.

A survey of journalism designed to acquaint students with the profession. The American newspaper as a social institution and a medium of communication. The reporting of public affairs and elementary editing.

J 102. Journalism II. Credit, 3 semester hours.

Prerequisite: J 101.

The basic principles of journalism and the organizational patterns of the mass media. The gathering of journalistic stories and the writing of general, simple, complex, and feature stories.

J 201. News Writing and Reporting. Credit, 3 semester hours.

Prerequisites: J 101, E 113.

The elements of news, the style and the structure of news stories, news gathering methods, copyreading and editing. Practical experience in reporting, writing, and editing.

J 301. Advanced Journalism and Feature Writing. Credit, 3 semester hours.

Prerequisite: J 201.

Theory of copyreading, editing, feature writing, headline writing, and reporting. Practical problems.

Law Enforcement

John R. Conway, Chairman

PA 103. Police Organization and Administration I. Credit, 3 semester hours.

A general study of police organization followed by a detailed study of police administration; includes coordination of all branches of a large police department. An evaluation of line, staff, and auxiliary functions and the interrelationship and interdependence of each. The utilization of planning, analysis, and operations units as administrative aids. Situations calling for maximum police effort are explained along with scientific illustrations.

PA 104. Police Organization and Administration II. Credit, 3 semester hours.

Prerequisite: PA 103.

A detailed study of police organization and procedures within a police department and consideration of the principles of organization and methods adopted by progressive departments to insure effective service to the community.

PA 106. Police Supervision. Credit, 3 semester hours.

Prerequisites: PA 103-104.

Supervisory problems within a police organization and the equating of sound principles of human relations and supervisory techniques to effective police performance. Course includes such topics as discipline, leadership, motivation, conference leadership, instruction, and training as well as a discussion of other tools and devices available to the supervisor in achieving departmental aims and objectives.

PA 201. Introduction to Forensic Science. Credit, 3 semester hours.

Prerequisite: PA 215.

A classroom lecture-discussion session and a practical laboratory period. Forensic Science (Criminalistics): the observation, collection, positive identification, and preservation of physical, chemical, and biological evidence for court presentation. The connection between the evidence found at the crime scene and the identification, apprehension, and conviction of the criminal. Fingerprints, identification of hairs and fibers, chemicals, narcotics, blood, semen, glass, soil and wood. Imprint and impression taking, bullet comparison, document examination, and various photographic methods.

PA 215. Principles of Investigation. Credit, 3 semester hours.

An introduction to criminal investigation in the field. Conduct at the crime scene, interview and interrogation of witnesses and suspects, the use of informants and the techniques of surveillance. The special techniques employed in particular kinds of investigation as well as presentation of the police case in court.

PA 217-218. American Legal System I and II. Credit, 6 semester hours.

The process through which justice is administered. History of the American Legal System. The Constitution of the United States as it applies to police forces. Also, rules of evidence with attention given to judicial notice, presumptions, the nature of real and circumstantial evidence, burden of proof, province of court and jury, documentary evidence, hearsay evidence, confessions, and admissions of witnesses. Particular emphasis will be given to evidence in criminal cases, presumptions of the penal law, the status of illegally obtained evidence, wire tapping, character evidence, proof of other crimes, admission of memorandum book entries, dying declarations, and involuntary confessions.

PA 221. Juvenile Delinquency. Credit, 3 semester hours.

Prequisites: P 111 and SS 113.

A general orientation to the field of delinquency and crime, including all aspects of the social and personal matrix out of which these forms of social destructiveness arise. An attempt is made to build up some consistent theory of causation in order to develop a suitable method of handling these serious problems.

PA 303-304. Forensic Laboratory I and II. Credit, 6 semester hours.

Prerequisites: PA 201, SC 121-22, CH 105-106.

Greater attention given to specific topics and to laboratory testing and identification than in PA 201 (Introduction to Forensic Science). In the classroom the laboratory or practical procedures are outlined and discussed. The laboratory work involves testing and identification of evidence and more detailed procedures are undertaken than in PA 201. An example would be the casting of hairs and fibers for microscopic identification of material as containing a narcotic or blood.

Laboratory and Breakage Fee: $15.00 per semester.

PA 311. Criminology. Credit, 3 semester hours.

Prerequisites: P 111 and SS 113.

The nature and causation of crime. Approaches to the study of crime, its treatment and prevention. The sociology of criminal law and the nature of criminal behavior; theories and research.

PA 401. Police Problems Seminar. Credit, 3 semester hours.

Prerequsite: Junior or Senior status.

An analysis of major police problems from the viewpoint of both the administrator and the line operations officer. Seeks the integration of established scientific knowledge with practical police experience.

PA 402. Police-Community Relations. Credit, 3 semester hours.

Prerequisites: P 111 and SS 113.

Designed to put the police and the community in a broad theoretical context. Sociological and environmental implications examined. Attention given to police practices which have caused much public hostility and which have isolated law enforcement from the rest of society.

Mathematics

Bruce W. Tyndall, Chairman

M 001. Mathematics Review I. No credit. Meets 3 hours per week.

Required of both day and evening students who do not show sufficient understanding of mathematics fundamentals, as determined by entrance examinations. Natural numbers, integers, rationals and irrationals, properties and operations in each, construction and solution of mathematical models using simple equations, and percentages.

M 002. Mathematics Review II. No credit. Meets 3 hours per week.

Prerequisite: M 001 or equivalent.

Continuation of M 001 offered to both day and evening students who do not show sufficient preparation for the standard course in college mathematics. Exponents, polynomials, rational functions, systems of equations, graphs, complex numbers, and quadratic equations.

M 115. Mathematical Analysis I. Credit, 3 semester hours.

Prerequisite: Entrance examination or satisfactory completion of M 002.

Cannot be taken for credit by mathematics, physical science, or engineering students.

Designed to offer the foundation needed for the study of calculus. Polynomials, algebraic functions, elementary point geometry, plane analytic trigonometry, and properties of exponential functions.

M 115S. Mathematical Analysis I. Credit, 3 semester hours.

Prerequisite: Entrance examination or satisfactory completion of M 002.

Cannot be taken for credit by mathematics, physical science, or engineering students.

Meets 5 times per week and is specially designed for engineering and other students going on to M 117. Topics covered include those of M 115 plus enough elementary analysis to permit entrance into M 117 and PH 108 concurrently.

M 116. Mathematical Analysis II. Credit, 3 semester hours.

Prerequisite: M 115.

Cannot be taken for credit by mathematics, physical science, or engineering students.

An intuitive approach to topics in functions, analytic geometry, differential and integral calculus, and probability. Designed for an insight into, and appreciation of, the methods of analysis.

M 117. Calculus I. Credit, 3 semester hours.

Prerequisite: M 115 or entrance examination.

The first-year college course for majors in mathematics, science, and engineering; and the basic prerequisite for all advanced mathematics. Introduces differential and integral calculus of functions of one variable, along with plane analytic geometry.

M 118. Calculus II. Credit, 3 semester hours.

Prerequisite: M 117.

Continuation of first-year calculus, including methods of integration, the fundamental integration theorem, differentiation and integration of transcendental functions, and varied applications.

M 121-122. Algebraic Structures I and II. Credit, 6 semester hours.

Prerequisite: Entrance examination.

A first course in abstract algebra: sets, mappings, operations, relations, elementary logic, number systems, and abstract systems.

M 137. Calculus Theory. Credit, 3 semester hours.

Prerequisite: Completion of 2 semesters of calculus at another school, but insufficient entrance examination score to start with M 203.

The theoretical material of the standard first year of calculus, including limits, chain rules, mean value theorems, and a discussion of the fundamental theorem of integral calculus. Upon successful completion, the student is qualified for M 203, Calculus III.

M 203. Calculus III. Credit, 3 semester hours.

Prerequisite: M 118.

The calculus of multiple variables, covering third dimensional topics in analytics, linear algebra, and vector analysis, plus partial differentiation, multiple integration, infinite series, and indeterminate forms.

M 204. Differential Equations. Credit, 3 semester hours.

Prerequisite: M 203.

The solution of ordinary differential equations, including the use of Laplace transforms. Existence of solutions, series solutions, matrix methods, non-linear equations, and varied applications.

M 227-228. Finite Mathematics I and II. Credit, 6 semester hours.

Prerequisite: M 116 or M 117.

Cannot be taken for credit by mathematics, physical science, or engineering students.

Matrix theory, linear programming, probability, and sets, with applications in the social and management sciences for computers.

M 231. Linear Algebra. Credit, 3 semester hours.

Prerequisites: M 203 and TM 204.

Matrices, linear systems, determinants, vector spaces, vector geometry, linear transformations, and quadratic forms.

M 301. Linear Analysis. Credit, 3 semester hours. Alternates Day and Evening.

Prerequisites: M 203 and M 231.

Vector spaces, infinite series, tensors, eigenvalue theory, transformations, unitary spaces, and an introduction to functional analysis.

M 303. Advanced Calculus I. Credit, 3 semester hours.

Prerequisite: M 204.

Topics covered from infinite series include convergence, tests for convergence, integration and differentiation, asymptotic expansions, and an introduction to real analysis concepts. Topics in complex variables include elementary functions, Cauchy-Riemann equations, Cauchy integral theorem, calculus of residues, integration, and conformal mapping.

M 304. Advanced Calculus II. Credit, 3 semester hours. Offered every other year.

Prerequisite: M 303.

Applied mathematics, including study of the Gamma and Beta functions, Laplace transforms, Legendre polynomials, Bessel functions, product solutions of partial differential equations, and boundary value problems.

M 305. Series Solutions. Credit, 3 semester hours. Offered by demand.

Prerequisite: M 204 and instructor's approval.

Considers series solutions of ordinary differential equations, including the hypergeometric type, Fourier analysis, introduction to perturbation methods, and successive approximation solutions of non-linear differential equations.

M 309. Advanced Differential Equations. Credit, 3 semester hours. Offered every other year.

Prerequisites: M 204 and M 231.

Theoretical analysis and applications of non-linear differential equations. Phase plane and space, perturbation theory and techniques, series and related methods, stability theory and techniques, and relaxation phenomena.

M 321-322. Modern Algebra I and II. Credit, 6 semester hours.

Prerequisites: M 122 and M 203.

Groups, rings, integral domains, fields, reals by Dedekind cuts, complex numbers, polynomials, vector spaces, linear transformations, and matrices.

M 325. Number Theory. Credit, 3 semester hours. Offered every other year.

Prerequisite: M 122 or M 118, and instructor's approval.

Topics are selected from the following: mathematical induction, Euclidean algorithm, integers, number theoretic functions, Euler-Fermat theorems, congruence, quadratic residues, and Peano axioms.

M 338-339. Numerical Analysis I and II. Credit, 6 semester hours. Offered every other year.

Prerequisite: M 204.

Approximation and error evaluation. Finite differences, approximation by polynomial and orthogonal series, solutions of ordinary differential equations, solutions of elliptic, parabolic, and hyperbolic partial differential equations, interpolation, and basic integral equation solutions.

M 341. Sets and Ordered Structures. Credit, 3 semester hours. Offered every other year.

Prerequisite: M 231.

Axiomatic set theory based on the Zermelo-Fraenkel theory, algebra of sets, relations and functions, finite and infinite sets, order, axiom of choice and its equivalents.

M 343. Projective Geometry. Credit, 3 semester hours. Offered every other year.

Prerequisites: M 203 and M 231.

Projective transformations, fixed points, invariants, cross-ratio, conics, Euclidean and non-Euclidean geometrics.

M 345. Differential Geometry. Credit, 3 semester hours. Offered every other year.

Prerequisites: M 204 and M 231.

Basic techniques of applied analysis as illustrated with geometry. Tensors, curvature, surface theory, covariant differentiation, Green's & Stoke's type theorems.

M 371. Probability Theory. Credit, 3 semester hours. Alternates Day and Evening.

Prerequisite: M 203.

Axiomatic study of probability: sample spaces, combinatorial analysis, independence and dependence, random variables, distribution functions, moment generating functions, central limit theorem.

M 372. Mathematical Statistics. Credit, 3 semester hours. Offered every other year.

Prerequisites: M 204 plus IE 346 and/or one mathematics course beyond M 204.

Fundamental topics in random variables plus central limit theorem, distribution-free problems, analysis of variance, and an introduction to multivariate distributions.

M 411-412. Real Analysis I and II. Credit, 6 semester hours.

Prerequisites: M 303 and M 322.

Foundations of analysis; sets and functions, limits, operations on sequences, continuous functions on metric spaces, differentiation, Riemann-Stieltjes integral, integration theory, and an introduction to measure theory and the Lebesque integral.

M 423. Complex Variables. Credit, 3 semester hours. Offered every other year.

Prerequisite: M 303.

For mathematics, science, and engineering students.

Review of elementary functions and Euler forms; plus holomorphic functions, Laurent series, singularities, calculus of residues, contour integration, maximum modulus theorem, bilinear and inverse transformations, conformal mapping, and analytic continuation.

M 441. Topology. Credit, 3 semester hours. Offered every other year.

Prerequisite: M 341.

Topics selected from the following: Hausdorff neighborhood relations, derived, open and closed sets, closure, topological space, bases, homeomorphisms, relative topology, product spaces, separation axioms, metric spaces, connectedness and compactness.

Mechanical Engineering

John C. Martin, Chairman

ME 101. Engineering Graphics. Credit, 3 semester hours.

An introduction to the principles and techniques of graphical communication. Fundamentals of orthographic projections; sections; applied geometry; auxiliary views; analysis of point, line, and plane relationships; detail and assembly drawings of simple machine parts.

ME 102. Engineering Drawing and Design. Credit, 3 semester hours.

Prerequisite: ME 101.

For technical students and draftsmen, covering layout of assembly drawings; detailing of their parts, properly dimensioned, for interchangeable manufacture; use of A S A tables of metal fits for machine parts; use of threads and fasteners with the use of tolerances and limits.

ME 124. Mechanical Processes. Credit, 3 semester hours.

Mill and manufacturing processes. The casting of metals, pattern making, and mold preparing. Fabricating, metal cutting, and welding. Demonstrations, laboratory, and inspection trips to local manufacturing plants.

ME 201. Statics. Credit, 3 semester hours.

Prerequisites: M 118 and PH 108.

Composition and resolution of forces in two and three dimensions. Equilibrium of forces in stationary systems. Analysis of trusses. Centroids and second moments, distributed forces, shear and bending moment diagrams, and friction.

ME 202. Mechanics of Materials I. Credit, 3 semester hours.

Prerequisite: ME 201.

Elastic behavior of structural elements under axial, flexural, and torsional loading. Stress in and deformation of structural elements, including beams. Lectures supplemented with laboratory exercises.

ME 204. Dynamics. Credit, 3 semester hours.

Prerequisites: ME 201 and M 203 (M 203 may be taken concurrently).

Kinematics and dynamics of particles and rigid bodies with emphasis on two dimensional problems. Vector representation of motion in rectangular, polar, and natural coordinates. Impulse-momentum and work-energy theorems. Rigid bodies in translation, rotation and general plane motion.

ME 301. Thermodynamics I. Credit, 3 semester hours.

Prerequisites: PH 210 and M 203.

Classical thermodynamics treatment of first and second laws. Thermal and caloric equations of state. Closed and open systems, and steady flow processes. Absolute temperature, entropy, combined first and second laws. Introduction to statistical thermodynamics: particle distributions, statistical concept of entropy, and relation to macroscopic properties.

ME 302. Thermodynamics II. Credit, 3 semester hours.

Prerequisite: ME 301.

Extensions and applications of first and second laws: availability, combustion processes, phase and chemical equilibrium, ideal gas mixtures, Maxwell's relations. Steam power and refrigeration cycles. Internal combustion engine and gas turbine cycles. Irreversible thermodynamics.

ME 307. Mechanics of Materials II. Credit, 3 semester hours.

Prerequisite: ME 202.

Elastic and plastic behavior of structural elements under simple and combined loading. Strain-energy method, compression members, ultimate strength design, composite member design, and Theory of Failure.

ME 311. Machine Elements. Credit, 3 semester hours.

Prerequisite: ME 202.

Analysis and design of machine elements to meet specified operating conditions. Stresses, deformations and other factors in design of machine parts. Application to machine elements such as joints, shafts, gears, couplings, brakes, clutches, and flexible power-transmitting elements.

ME 312. Mechanical Design. Credit, 3 semester hours.

Prerequisite: ME 311.

Continuation of Machine Elements. Design projects selected individually and developed by the student.

ME 315. Mechanical Engineering Laboratory No. I. Credit, 2 semester hours.

Prerequisites: M 202 and ME 344 (ME 344 may be taken concurrently)

Students conduct selected tests in the fields of Mechanics of Materials and Vibrations. Emphasis placed on organization of the experiment, measurement techniques, sources of error and organization of the report. Students are required to design, conduct, and present one experiment of their own.

Note: Part-time students are charged for a standard 3 semester hour course.

ME 318. Advanced Materials Processing. Credit, 3 semester hours.

Prerequisites: ME 124 and ME 202.

Properties of materials. Forming, grinding, and cutting methods. Analysis of modern methods such as electrolytic grinding, high energy forming, and numerical control of machine tools.

ME 321. Fluid Mechanics. Credit, 3 semester hours.

Prerequisite: ME 204.

Fluid kinematics: continuity equation, vector operations. Momentum equation for frictionless flow: Bernulli equation with applications. Irrotational flow: velocity potential, Laplace's equation, dynamic pressure and lift. Stream function for incompressible flows. Rotational flows: vorticity, circulation, lift and drag. Integral momentum analysis. Navier Stokes equation: stress lensor, Newington fluid. Boundary layer approximations.

ME 322. Introduction to Gas Dynamics. Credit, 3 semester hours.

Prerequisite: ME 321.

Compressible fluid flow with emphasis on one-dimensional ducted steady flows with heat transfer, frictional effects, shock waves and combined effects. Introductory considerations of two and three dimensional flows. Occasional demonstrations will accompany the lectures.

ME 335. Tool design. Credit, 3 semester hours.

Prerequisites: ME 124 and ME 201.

Basic techniques of tool design, methods analysis, drill jig design, tolerances and allowances, cutting tools, die design, gauges, and fixtures.

ME 336. Tool Engineering. Credit, 3 semester hours.

Prerequisite: ME 335.

A continuation of ME 335 with emphasis on economics, estimating, and process planning. Student design projects requiring the complete planning and designing necessary to manufacture machine parts.

ME 343. Mechanisms. Credit, 3 semester hours.

Prerequisites: ME 204 and M 204.

Graphical and analytical methods for determining displacements, velocities, and accelerations of machine component. Application to simple mechanisms such as linkages, cams, and gear.

ME 344. Mechanics of Vibration. Credit, 3 semester hours.

Prerequisites: ME 204 and M 204.

The mathematical relationships necessary for the solution of problems involving the vibration of lumped and continuous systems; damping; free and forced motion; resonance; isolation; energy methods; balancing; single, two and multiple degrees of freedom; vibration measurement.

ME 401. Mechanical Systems Analysis. Credit, 3 semester hours.

Prerequisites: EE 224 ad ME 344.

Dynamical systems and their characteristics. Analogy of electrical, mechanical, and other systems. Mixed systems—Dimensional Analysis—Design considerations.

ME 403. Introduction to Flight Propulsion. Credit, 3 semester hours.

Prerequisites: M 322 and Instructor's consent.

A senior course designed for those students who intend to work or pursue further studies in the Aerospace field. Among the topics covered are: Detonation and deflagration, introductory one-dimensional non-steady gas flows, basic concepts of turbomachinery and a survey of the contemporary propulsive devices. Shock tubes, supersonic wind tunnel and flame propagation demonstrations will accompany the lectures.

ME 404. Heat and Mass Transfer. Credit, 3 semester hours.

Prerequisite: ME 321.

Conduction in solids, solution of multi-dimensional conduction problems, unsteady conduction, radiation, boundary layer and convection. Introduction to mass transfer. The lectures will include occasional demonstrations of convection, radiation, heat exchangers, etc.

ME 405. Advanced Mechanical Design. Credit, 3 semester hours.

Prerequisites: ME 312 and ME 321.

Selected and advanced topics related to the design of Machine Elements such as hydrodynamic theory of lubrication and principles of hydraulic machines with application to hydraulic couplings.

ME 408. Advanced Dynamics. Credit, 3 semester hours.

Prerequisite: ME 204, M 304 or Instructor's consent.

Plane and spatial motion of paricles and rigid bodies, inertia tensor, relative motion, gyroscopes, central force motion, Langrangian and Hamiltonian Methods.

ME 512. Senior Seminar. Credit, 3 semester hours.

Open to Seniors in Mechanical Engineering only.

An independent design, theoretical analysis, or laboratory investigation as chosen by the student and approved by the Chairman of the Department. The work is performed by the student with frequent critiques by the responsible faculty member.

Metallurgy and Materials

John C. Martin, Coordinator

MT 123. Engineering Materials. Credit, 3 semester hours.

The principal engineering materials of modern technology. Physical testing and the evaluation of tests; steels and non-ferrous alloys and their heat treatment; cement, concrete, wood, ceramics, and plastics. Gives engineers sufficient background in these materials to aid them in selecting and setting specifications. Laboratory sessions enable students to witness and perform mechanical tests, heat treatments, hardenability tests, and cold rolling and annealing operations.

MT 219. Physical Metallurgy. Credit, 3 semester hours.

Prerequisites: PH 209 and CH 105 (CH 105 may be taken concurrently).

A basic understanding of the structure and properties of metals and chemical or physical processes by means of which such characteristics are modified. Discussions on metallurgical tests, equilibrium phase diagrams, heat treatment of ferrous and non-ferrous alloys, steel production, and hot and cold working of metals. Appropriate laboratory experiments included in addition to lectures. Gives the prospective engineer an acquaintance with metals fabrication and heat treatment.

MT 220. Metallography. Credit, 3 semester hours.

Prerequisite: MT 219.

Further understanding of physical metallurgy with emphasis on diffusion, precipitation hardening, solidification, heat treatment, and crystallography. Several lectures devoted to the preparation of metallurgical specimens for microscopic examination, the resulting microstructural appearance and its relation to properties. Lectures supplemented by laboratory work.

MT 301. Welding Metallurgy. Credit, 3 semester hours.

Prerequisite: MT 220.

Welding and brazing procedures for ferrous and non-ferrous alloys. Demonstrations and examinations of macro and microstructures of welded members. The following processes studied in detail: brazing, metal arc, inert atmosphere, atomic hydrogen, electron beam, laser, and resistance welding.

MT 302. Rubber and Plastics Technology. Credit, 3 semester hours.

Natural and synthetic rubbers, their production and fabrication with attention to vulcanizing, additives, and fillers. Tire manufacture discussed in detail. Thermoplastic and thermo-setting plastics reviewed in terms of chemistry, properties, and molding methods.

MT 304. High Temperature Alloys. Credit, 3 semester hours.

Elevated temperature behavior of alloys as well as associated tensile, creep, rupture, and fatigue testing. Ferritic and austenitic steels, nickel and cobalt base superalloys in terms of composition, structure, and strengthening mechanisms. Other alloy systems such as titanium, columbium, tantalum, chromium, molybdenum, and tungsten.

MT 324. Nuclear Metallurgy. Credit, 3 semester hours.

Prerequisites: MT 219 and PH 315.

Nuclear reactors, production and fabrication of uranium metal and alloys, metallurgy of zirconium, thorium, plutonium, beryllium, liquid metals used in nuclear reactors, fabrication of reactor components, non-destructive materials testing, and the radiation damage of materials.

MT 331. Non-ferrous Metallurgy. Credit, 3 semester hours.

Prerequisite: MT 220.

The physical metallurgy of aluminum, magnesium, copper, nickel, zinc, lead, tin and their alloys covered by lecture, discussion, and laboratory work. Melting, alloying, casting, extruding, rolling, drawing, and heat treating of the metals with emphasis on the efforts of variables and reasons therefor. Typical mill and service difficulties analyzed in the light of the specific fundamental principles involved.

MT 342. Steels and Their Heat Treatment. Credit, 3 semester hours.

Prerequisite: MT 220.

Fundamentals of ferrous physical metallurgy such as the iron-carbon phase diagram, time-temperature-transformation diagrams, hardenability, and the effects of alloying elements. Heat treating discussed in terms of resulting microstructures and physical properties. Practical applications include engineering steels, tool steels, and stainless steels, as well as the requirements of deep drawing, low carbon steel.

Music

John Collinson, Dean, Arts and Sciences

MU 101. Introduction to Music. Credit, 3 semester hours.

Some of the basic forms of music and styles of various composers. Music appreciation.

MU 102. The Problems of Music. Credit, 3 semester hours.

Musical aesthetics and its relationship to the composer and his works. The problem of music as an art form in the twentieth century. A continuation of MU 101.

MU 105-106. Chorus. Credit, 1-8 semester hours; maximum per semester, 1 credit.

Open to all students interested in group singing. Students with adequate scholastic standing may carry this course for credit in addition to a normal program. Two hours a week.

MU 201. Music Analysis and History. Credit, 3 semester hours.

Prerequisite: Must have basic reading ability in musical notation.

The growth of Western music to 1850. Analysis of musical masterpieces on a technical and conceptual basis.

MU 202. The Development of Contemporary Music. Credit, 3 semester hours.

Prerequisite: Must have basic reading ability in musical notation.

A continuation of MU 201, from 1850 to the present day. The medium of music as a structural and an emotional tool. Analysis of contemporary theories and compositions.

Philosophy

John Collinson, Dean, Arts and Sciences

PHL 111. Introduction to Problems of Philosophy. Credit, 3 semester hours.

Man's place in the universe, how we discover truth, the nature of beauty and the good, the basis of moral choices, etc.

PH 113. History of Philosophy through the Renaissance. Credit, 3 semester hours.

Chronological introduction to problems of philosophy. Pre-Socratics, Plato, Aristotle, Medieval and Renaissance philosophers.

PHL 114. History of Modern Philosophy. Credit, 3 semester hours.

Chronological introduction to problems of philosophy. Seventeenth Century to the present, including Descartes, Hume, Hegel, Nietzsche, and contemporary philosophers.

PHL 124. Logic and Scientific Method. Credit, 3 semester hours.

Introduces the student to deduction, warranted induction, and scientific description.

PHL 213. Contemporary Issues in Philosophy. Credit, 3-6 semester hours.

Content varies with the interest of the instructor and the students. Current philosophical thinking in such areas as natural science, social science, metaphysics, religion, aesthetics, theory of knowledge, language, existentialism, ethics, and positivism.

PHL 222. Ethics in a Changing Society. Credit, 3 semester hours.

Prerequisite: PHL 111 or 113.

The major ethical systems in the framework of contemporary society. Ethical norms which point to goals of life and their relation to the issues in science, business, the professions, and other human activities.

PHL 225. Symbolic Logic. Credit, 3 semester hours.

Prerequisite: PHL 124 or M 121.

Formal deductive systems, including the propositional calculus, the calculus of functions, independence of axioms, primitive symbols, interpretation, paradoxes, theory of types, Goedel's theorem.

Physical Education

Donald R. Ormrod, Director of Athletics

PE 111-112. Physical Education. No credit.

Sports, rhythms, physical fitness tests, and exercises. Basic course required of all day freshmen who are not exempt because of similar experience in the Service or because of medical excuse.

PE 113-114. Physical Education (women). No credit.

Same as above.

PE 221-222. Personal Hygiene. No credit.

Required of all day freshmen who are exempt from PE 111-112 or PE 113-114. Personal aspects of hygiene, dealing with the principles of healthful living, mental attitude, diet, and the value of systematic exercise.

Physics

Irwin S. Boak, Chairman

PH 108. Physics I w/Lab. Credit, 3 semester hours.

Prerequisite: M 117 or instructor's approval.

Fundamental concepts and mathematical exposition, including calculus, of mechanics, statics, kinematics, Newton's laws, work, energy, power, conservation of energy and momentum, rotational concepts, simple harmonic motion.

Laboratory and Breakage Fee: $15.00.

PH 101-102. General Physics w/Lab. Credit, 6 semester hours.

Prerequisite: M 115 or equivalent.

Basic physics for students not majoring in science or engineering. Principles of mechanics, heat, energy, electricity, sound and light, without calculus. Students encouraged to examine the philosophy of physical science through outside reading and simple laboratory work.

Laboratory and Breakage Fee: $15.00 per semester.

PH 203. Techniques in Nuclear Physics. Credit, 2 semester hours.

Prerequisites: Two semesters of a laboratory science and instructor's consent.

The instruments and methods of nuclear physics. Experiments may be completed in biology, chemistry, engineering or physics, according to the interest of the student.

PH 209. Physics II w/Lab. Credit, 3 semester hours.

Prerequisites: PH 108 or PH 202, M 118.

Fundamental concepts and mathematical exposition, including calculus, of electricity and magnetism, electrostatics, direct currents, magnetic effects of a current, electrical instruments, ballistic galvanometer, induced E.M.F., inductance and capacitance, simple harmonic motion, physical basis for A.C. circuits, bridge measurements, potentiometer measurements.

Laboratory and Breakage Fee: $15.00.

PH 210. Physics III w/Lab. Credit, 3 semester hours.

Prerequisites: PH 108 and M 118.

Fundamental radiation topics include heat, sound, light; simple harmonic motion, generation of mathematical wave forms, wave propagation, laser demonstration of optical principles, lens systems, theory of color, wave interference, gratings, prisms, filters, spectroscopy.

Laboratory and Breakage Fee: $15.00.

PH 211. Physics IV. Credit, 3 semester hours.

Prerequisite: PH 210.

Modern physics fundamentals. Twentieth-century developments in physics. Special relativity, quantum theory of radiation, DeBroglie waves, the Bohr atom, elementary wave mechanics, the solid state, crystal structure, semiconductors, and lasers.

PH 301. Analytical Mechanics. Credit, 3 semester hours.

Prerequisites: M 204, PH 108, or instructor's approval.

Intermediate analytical mechanics. Statics and dynamics of particles and rigid body with emphasis on the theory of motion under central forces and on the use of the generalized coordinates; introduction to an elementary Lagrangian and Hamiltonian formalism; small vibrations.

PH 315. Nuclear Physics. Credit, 3 semester hours.

Prerequisite: PH 211 or instructor's approval.

Elementary nuclear physics. Nuclear structure, natural radioactivity, induced radioactivity, nuclear forces, and reactions, fission and fusion, reactors, and topics of special interest.

PH 340. Lasers. Credit, 2 semester hours.

Prerequisite: PH 210 or instructor's approval.

Laser theory, construction and application to latest engineering and scientific uses.

PH 351-352. Intermediate Electricity and Magnetism. Credit, 6 semester hours.

Prerequisites: PH 209 and M 204.

Electric field, potential, Gausse Law, dipoles, poissions, and LaPlace equations, dialectric theory, steady magnetic fields, electromagnetic induction, magnetic properties of matter, Maxwell equations, L-C-R circuits, A.C. circuit analysis, vacuum tube and transistor circuit theory.

PH 361. Modern Optics. Credit, 3 semester hours.

Prerequisite: PH 210.

Solid state spectroscopy from the point of view of the research physicist and chemist. Modern optical devices including television pick-up tubes, electro- and inspection-luminescent devices, image amplifiers, lasers and holography, fiber-optics, opto-electronics for computers.

PH 371. Advanced Laboratory I. Credit, 2 semester hours.

Prerequisite: PH 209.

Application of electrical and magnetic theory to ballistic galvanometer, cathode ray oscilloscope, current balance, oscillators, amplifiers, transistor and vacuum tube circuits, design of laboratory measuring equipment. Two 3-hour laboratory periods weekly.

PH 372. Advanced Laboratory II. Credit, 2 semester hours.

Prerequisite: PH 210.

Selected experiments in optics including lasers (construction and applications), interferometry and spectrometry.

PH 373. Advanced Laboratory III. Credit, 2 semester hours.

Prerequisite: PH 211.

Selected experiments in atomic and nuclear physics including nuclear radiation and decay, quantization of charge and light energy, and nuclear magnetic resonance.

PH 400. Statistical Mechanics. Credit, 3 semester hours.

Prerequisites: PH 301 and instructor's approval. PH 211, PH 452 or instructor's approval.

An introductory course in classical and quantum statistical mechanics. The canonical ensemble; Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics and their applications; statistical interpretation of thermodynamics; transport processes.

PH 401. Atomic Physics. Credit, 3 semester hours.

Prerequisite: PH 211.

Structure and interactions of atomic systems including Schrodinger's equation, atomic bonding, scattering and mean free path, radiative transitions, and laser theory.

PH 404. Senior Project. Credit, 1-6 semester hours.

Open only to senior Physics Majors. Individual projects in experimental or theoretical physics to be carried out under direct supervision of a faculty advisor.

PH 406. Solid State Physics. Credit, 3 semester hours.

Prerequisite: PH 211.

Elementary principles of the electrical behavior of solids as applied to semiconductors, metallurgy, and magnetically activated solid state devices.

PH 451. Elementary Quantum Mechanics. Credit, 3 semester hours.

Prerequisite: PH 211 and instructor's approval.

An elementary treatment of nonrelativistic quantum mechanics. Schrodinger's equation with its applications to atomic and nuclear structure; collision theory; radiation; introductory perturbation theory.

PH 452. Thermodynamics. Credit, 3 semester hours.

Prerequisite: PH 108 and instructor's approval.

An introduction to thermodynamics and kinetic theory. Laws of thermodynamics, entropy, application to simple physical and chemical systems; thermodynamic inequalities and equilibrium; phase transitions; properties of ideal gases; low temperature physics.

PH 470. Theory of Relativity. Credit, 3 semester hours.

Prerequisite: Instructor's approval.

Introductory course on Einstein's theory of relativity. Special theory of relativity including the Lorentz transformation, Minkowsky geometry, relativistic mechanics, and electromagnetism. General theory of relativity including principle of equivalence, Einstein's theory of gravitation, quantum theory of gravitation.

Political Science

Phillip S. Kaplan, Chairman

PS 121. American Government. Credit, 3 semester hours.

The structure and functions of the national government, party organization, national and state relations, and American politics as compared to those of other countries and the trends in modern politics.

PS 122. State and Local Government. Credit, 3 semester hours.

Prerequisite: PS 121.

The structure and functions of state and local governments in the United States.

PS 216. Municipal Government. Credit, 3 semester hours.

Prerequisite: PS 122.

Intensive study of selected problems of structure, organization, and powers of local government; intergovernmental relationships; administrative and personnel management; special application to Connecticut.

PS 221. Introduction to International Relations. Credit, 3 semester hours.

May be taken in place of PS 122.

Trends of contemporary international politics, the foreign policy process, selected substantive issues of foreign policy. The East-West confrontation, including a short history of the "cold war" and the current state of its major protagonists and their alliance systems. The "emerging countries," Western European integration, and the United Nations.

PS 302. The U.S. Constitution. Credit, 3 semester hours.

Prerequisite: PS 121.

Principles and concepts of the Constitution as revealed in leading decisions of courts. Concepts and principles of judicial review, federalism, separation of powers, implied powers, due process of law, equal protection, the contract clause, etc.

PS 304. Political Parties. Credit, 3 semester hours.

Prerequisite: PS 121.

An historical and functional analysis of American political parties, including a study of interest groups, public opinion, electoral devices, political leaders, and proposals for the reorganization of the existing party structure.

Psychology

Phillip S. Kaplan, Chairman

P 111. Psychology. Credit, 3 semester hours.

Important principles of human behavior. Motivation, emotion, learning, personality, intelligence, etc. The utilization of psychological knowledge in relation to everyday human activities.

P 212. Business and Industrial Psychology. Credit, 3 semester hours.

Prerequisite: P 111.

Psychological principles and research findings pertinent to administration in business and industry. Contemporary research of behavior factors in managerial contexts.

P 321. Social Psychology. Credit, 3 semester hours.

Prerequisites: P 111 and SS 113.

The interdependence of social organizations and behavior. The interrelationships between role systems and personality; attitude analysis, development and modification; group interaction analysis; social conformity; social class and human behavior.

P 336. Abnormal Psychology. Credit, 3 semester hours.

Prerequisite: P 111.

Psychological and organic factors involved in personality disorganization. The psychodynamics and classification of psychoses, neuroses, brain disorders, personality disorders, psychophysiological disorders, transient stress disorders, and mental retardation.

Public and Social Administration

Peter T. Van Suetendael, Chairman

SA 211. Principles of Public Administration. Credit, 3 semester hours.

Prerequisites: PS 121 and PS 122 or PS 216.

The development, organization, functions, and problems of national, state, and local administration.

SA 301-302. Social Administration I and II. Credit, 6 semester hours.

Prerequisites: SA 211 and SS 113.

Welfare legislation, counseling in social administration, criminology, fields of social work, introduction to public welfare, introduction to case work, sociology of minority relations, child welfare problems, juvenile delinquency, group dynamics, methods of social research, introductory social statistics, sociology of the family, sociology of industry, population problems, problems of an aging population, problems of redevelopment, and urban renewal.

SA 400. Minority Group Relations. Credit, 3 semester hours.

Prerequisites: SS 113 and PA 218.

An interdisciplinary survey of minority groups in this country with particular attention paid to those ethnic, religious, and racial factors that influence interaction. Designed to promote an understanding of sub-group cultures.

SA 410. Urban Sociology. Credit, 3 semester hours.

Prerequisite: SS 113.

The problems of the cities. Residential patterns together with the physical development of cities and redevelopment plans. An examination of groups of people and their environment and the relationship between the two.

SA 501-502. Internship. Credit, 3 semester hours.

Prerequisites or to be taken concurrently: SA 211 and SA 301-302.

Registration only by permission of the Department Chairman.

A seminar for Social Administration majors. The program is in conjunction with social agencies in the area. The student engages in actual field experience in the area of his major field of interest. Seminars in conjunction with this experience provide an opportunity for an understanding of group and individual dynamics.

SA 512. Research Seminar. Credit, 3 semester hours.

Prerequisites: BA 216 Statistics.

The student develops and carries out an original research project in social science, reporting his procedure to the class.

Science

H. Fessenden Wright, Chairman

SC 111-112. Physical Science. Credit, 6 semester hours.

Science and its relation to other areas of learning and to his daily living. Development and unity of physical science as a field of knowledge. Subject material includes astronomy, physics, chemistry, and geology.

SC 121-122. Biology. Credit, 6 semester hours.

A survey of the members of the three biological kingdoms; the basic concepts of cellular structure and function. Comparison of the anatomy and physiology of representative members of the protist, the plant, and the animal kingdoms. Major emphasis placed on the human organism. Students introduced to each of the major subdivisions of biology.

SC 131-132. Biology Laboratory. Credit, 2 semester hours.

The microscopic examination of cells and tissues and the dissection of various organisms from the earthworm to the fetal pig.

Laboratory Fee: $15.00 per semester.

Note: Students who plan to take advanced courses in biology, or who are science majors, or who plan to transfer biology credits must take SC 131-132.

SC 201. Genetics. Credit, 3 semester hours.

Prerequisites: SC 122, SC 251, or SC 252.

Mendelian genetics and developments that have produced the modern concept of inheritance; the role of DNA and theories of the chemical basis of heredity.

SC 202. Genetics Laboratory. Credit, 3 semester hours.

Prerequisite: SC 201.

The theory and techniques of the laboratory experiments. Two of the laboratory sessions per week are entirely devoted to experimentation, using flies, yeasts and bacteria to illustrate the classified theories of genetics.

Laboratory Fee: $15.00.

SC 211-212. Human Anatomy & Physiology. Credit, 6 semester hours.

Prerequisites: SC 122 and SC 132 or SC 251.

The essentials of human anatomy and physiology. Systems studied one at a time, taking up the anatomical features first and then the physiological functions. Both normal and pathological conditions discussed whenever possible.

SC 251. Zoology w/Lab. Credit, 4 semester hours.

Prerequisite: SC 122.

The general morphology and phsysiology of animals from the amoeba to man, taken phylum by phylum. Dissection of representative animals from the major phyla, special emphasis on the Phyla Invertebrata.

Laboratory Fee: $15.00.

SC 252. Botany w/Lab. Credit, 4 semester hours.

Prerequisites: SC 122 or SC 251 and SC 132.

The comparative structure, function, habitat, and evolutionary relationships of plants, techniques of plant identification and classification. Field trips conducted when possible.

SC 301. Microbiology w/Lab. Credit, 4 semester hours.

Prerequisites: SC 251 and SC 252.

A history of microbiology and a survey of microbial life. Bacteria as characteristic prototypes of all microorganisms; the environment, growth, reproduction, metabolism, and relationship to man of microorganisms.

Laboratory Fee: $15.00.

SC 302. Bacteriology w/Lab. Credit, 4 semester hours.

Prerequisite: SC 301.

Theoretical and laboratory study of the morphology, physiology, and classification of bacteria and other microorganisms. The application of these facts to agriculture, industry, sanitation, public health, and disease.

Laboratory Fee: $15.00.

SC 307. Comparative Vertebrate Anatomy w/Lab. Credit, 4 semester hours.

Prerequisite: SC 251.

The structure, origin, and evolutionary history of the vertebrate organ systems. In the laboratory, representative species of each vertebrate class dissected, with attention given to the individual organ systems.

Laboratory Fee: $15.00.

SC 321. Ecology. Credit, 3 semester hours.

Prerequisite: SC 122.

The interrelationships between animals, particularly man, and their biotic environment; food, reproduction, populations, communities, migration, distribution, succession, rhythms, adaptions, and applications.

SC 411-412. Biochemistry w/Lab. Credit, 8 semester hours.

Prerequisites: CH 105-106 and SC 121 or equivalent.

Students with credit for CH 302 will take SC 412.

Theories and reactions of organic compounds. Study of proteins, coenzymes, enzymes, carbohydrates, etc. Laboratory: preparation, separation, purification techniques, reaction tests and enzyme rate reductions.

Laboratory Fee: $15.00 per semester.

Sociology

Thomas Katsaros, Chairman

SS 113. Sociology. Credit, 3 semester hours.

The role of culture in society, the person, and personality; groups and group behavior; institutions; social interaction and social change.

SS 114. Problems in Sociology. Credit, 3 semester hours.

Prerequisite: SS 113.

The major problems which confront the present social order, and the methods now in practice or being considered for dealing with these problems.

SS 312. Marriage-Family as a Sociological Institution. Credit, 3 semester hours.

Prerequisite: SS 113.

Sociological analysis as developed in Sociology 113 is applied to an overview of contemporary problems of the social order to find the many interconnections among these problems.

SS 312. Marriage-Family as a Sociological Institution. Credit, 3 semester hours.

Prerequisite: SS 113.

The structure and function of the family in American Society: analysis of social relations within the institution, factors contributing to its successful functioning, and those leading to alienation and social disorganization.

Theater Arts

Carroll P. Cole, Coordinator

T 131-132. Introduction to the Theater. Credit, 6 semester hours.

Using the theater resources of the New Haven area, students will study topics such as playwriting, directing, acting, set design, dramatic criticism. Students must pay theater admissions.

T 141-142. World Drama and Theater. Credit, 6 semester hours.

Dramatic literature from classical times to the present, considered in its contemporary theatrical setting.

T 341-342. Acting and Directing. Credit, 6 semester hours.

Exercises in acting and directing, moving from the elementary to the complex. Emphasis on acting during the first semester and directing during the second. The student may participate in major workshop productions.

T 491-492. Theater Arts Seminar. Credit, 6 semester hours.

Prerequisites: T 131-132, T 141-142, T 341-342 or instructor's consent.

Independent study in special areas of drama: theater history, dramatic literature, criticism, playwriting, directing, acting.

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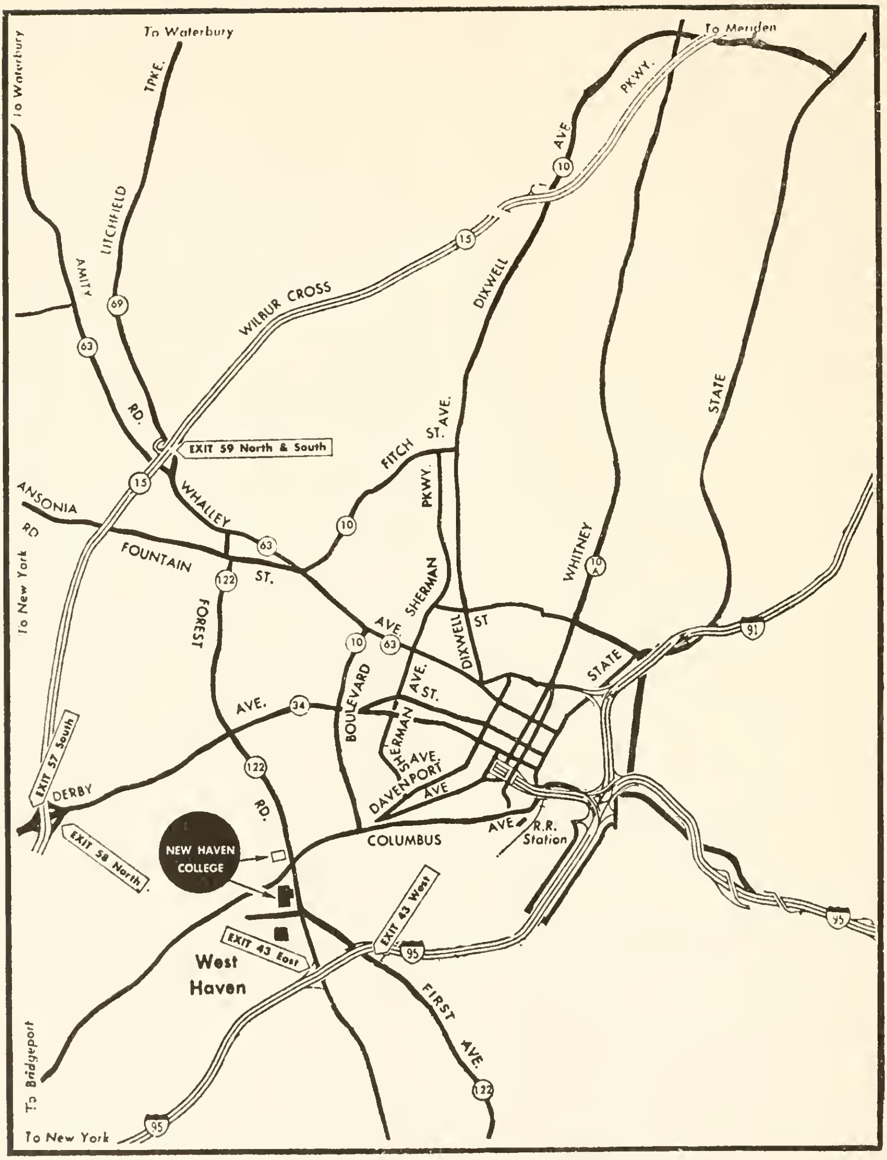
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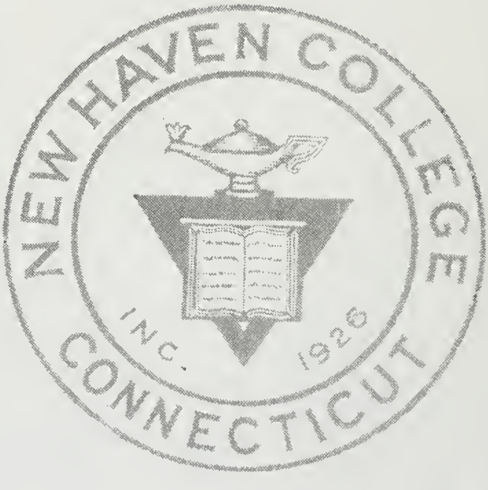

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